



House of Commons
Science and Technology
Committee

The Reviews into the University of East Anglia's Climatic Research Unit's E-mails

First Report of Session 2010–11

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The Science and Technology Committee

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Summary

The disclosure of climate data from the Climatic Research Unit (CRU) at the University of East Anglia (UEA) in November 2009 generated immense media interest as the story broke in the run up to the 2009 Copenhagen climate change conference. It was alleged that the leaked material showed a deliberate and systematic attempt by leading climate scientists to manipulate climate data, to support their global warming claims. It was also alleged that CRU may have attempted to abuse the process of peer review to prevent the publication of research papers with conflicting opinions about climate change and that UEA may not have complied with the requirements of the Freedom of Information Act 2000.

UEA set up two inquiries: the Independent Climate Change E-mails Review (ICCER) into the allegations against CRU, which was headed by Sir Muir Russell, and an independent external Scientific Appraisal Panel (SAP), headed by Lord Oxburgh.

In addition, our predecessors in the last Parliament carried out an inquiry but were constrained by the time available before the end of the Parliament. Neither the ICCER nor the SAP had produced their reports before our predecessors reported to the House. Our report focuses on how the ICCER and SAP did their job and addressed the issues raised.

We have some reservations about both inquiries. The scope and purpose of the SAP review appeared to change from an examination of the integrity of the science to the integrity of the scientists and as result there has been some confusion. The disparity in length between the SAP report and ICCER could foster the impression that it was not as thorough as the ICCER. We were also concerned that the SAP should have been more open and transparent. The process by which it selected the documents for review could have been more open and it should have published its working papers.

In contrast the ICCER was more comprehensive and transparent, although, we believe, that it should have taken its evidence in public. We are concerned that it did not fully investigate the serious allegation relating to the deletion of e-mails. We find it unsatisfactory that we are left with a verbal reassurance from the Vice-Chancellor that the e-mails still exist.

The disclosure of data from CRU has been traumatic and challenging for all involved. While we have some reservations about the reviews which UEA commissioned, the key point is that they have made a number of constructive recommendations. In our view it is time to make the changes and improvements recommended and with greater openness and transparency move on.

1 Introduction

Background

1. On 31 March 2010, the former Science and Technology Committee published its report on the disclosure of climate data from the Climatic Research Unit (CRU) at the University of East Anglia (UEA).¹ Due to the approaching general election, the former Committee had to complete its work before two reviews that UEA itself had set up reported. The former Committee's report contained a number of recommendations aimed at these two reviews. The first of the reviews was the Independent Climate Change E-mails Review (ICCER), headed by Sir Muir Russell, a former civil servant and former Principal and Vice-Chancellor of the University of Glasgow.² The second was the independent Scientific Assessment Panel (SAP) review, headed by Lord Oxburgh, an eminent geologist and former Rector of Imperial College London.³ Both reviews have now reported and we as the newly formed Science and Technology Committee have assessed how they responded to the former Committee's recommendations and the concerns that it raised.

The disclosure of climate data

2. In mid-November 2009 it was widely reported that a server used by CRU at UEA had been accessed, with 160 MB of data, containing more than 1,000 e-mails and 3,000 other documents, being copied and released on the internet.⁴ Media interest was immense, as the story broke in the run up to the Copenhagen climate change conference, which took place in December 2009. It is not known exactly how and when the breach occurred; the RealClimate website, indicated that UEA had been notified of the possible security breach on 17 November 2009.⁵

3. UEA issued a statement on 23 November 2009:

It is a matter of concern that data, including personal information about individuals, appears to have been illegally taken from the university and elements published selectively on a number of websites.

1 Eighth Report from the Science and Technology Committee, Session 2009–10, *The disclosure of climate data from the Climatic Research Unit at the University of East Anglia*, HC 387–I

2 "Sir Muir Russell to head the Independent Review into the allegations against the Climatic Research Unit (CRU)", UEA press notice, 3 December 2009; the ICCER was published 7 July 2010; the review was chaired by Sir Muir Russell and the review team consisted of Professor Geoffrey Boulton, Professor Peter Clarke, David Eyton and Professor James Norton.

3 "New scientific assessment of climatic research publications announced", UEA press notice, 11 February 2010; the Report of the International Panel set up by the University of East Anglia to examine the research of the Climatic Research Unit published its report ("SAP report") on 14 April 2010; it was chaired by Lord Oxburgh and the members were Professor Huw Davies, Professor Kerry Emanuel, Professor Lisa Graumlich, Professor David Hand, Professor Herbert Huppert and Professor Michael Kelly.

4 "Climate sceptics claim leaked emails are evidence of collusion among scientists", *The Guardian*, 20 November 2009; and "Hackers steal electronic data from top climate research center", *The Washington Post*, 21 November 2009

5 RealClimate website, www.realclimate.org/index.php/archives/2009/11/the-cru-hack

The volume of material published and its piecemeal nature makes it impossible to confirm what proportion is genuine. We took immediate action to remove the server in question from operation and have involved the police in what we consider to be a criminal investigation.⁶

4. Contributors to climate change debate websites and written submissions to the former Science and Technology Committee claimed that the leaked material showed a deliberate and systematic attempt by leading climate scientists to manipulate climate data, arbitrarily adjusting and “cherry-picking” data that supported their global warming claims and deleting adverse data that questioned their theories.⁷ It was also alleged that UEA may not have complied with the requirements of the Freedom of Information Act 2000 (FoIA), that inappropriate statistical methods and defective computer programmes may have been used to analyse data and that CRU may have attempted to abuse the process of peer review to prevent the publication of research papers with conflicting opinions about climate change.⁸

The independent reviews set up by UEA

5. On 3 December 2009, in the light of the serious allegations against CRU staff and the resulting damaging press coverage against UEA, the university announced that an independent review (ICCER) into the allegations against CRU would be carried out by Sir Muir Russell.⁹ Professor Edward Acton, UEA Vice-Chancellor, explained that Sir Muir was asked to head the review because he had “an understanding of the conduct of universities and research” but was “entirely independent of any association” with UEA and the climate change debate.¹⁰

6. UEA subsequently announced a second review—an independent external reappraisal of the science in key CRU publications—to complement the ICCER.¹¹ On 22 March 2010, UEA appointed Lord Oxburgh as chair of the SAP that would carry out this review.¹²

The former Committee's inquiry

7. In December 2009 the former Science and Technology Committee was concerned by the press reports about the disclosure of the e-mails at CRU and on 1 December 2009 the Chair of the former Committee wrote to the Vice-Chancellor of UEA. The letter explained that the Committee took a close interest in academic integrity and the systems in place to

6 “CRU update 1”, UEA press notice, 23 November 2009

7 HC (2009–10) 387–I, para 6 and HC (2009–10) 387–II, Ev 85 [Roger Helmer MEP], Ev 92 [Godfrey Bloom MEP], and Ev 144 [Stephen McIntyre]

8 HC (2009–10) 387–I, para 6 and HC (2009–10) 387–II, Ev 90 [Phillip Bratby], Ev 115 [David Holland], para 2, Ev 144 [Stephen McIntyre], Ev 195 [Peabody Energy Company], para 24

9 “Sir Muir Russell to head the Independent Review into the allegations against the Climatic Research Unit”, UEA press notice, 3 December 2009

10 HC (2009–10) 387–II, Ev 16

11 “New scientific assessment of climatic research publications announced”, UEA press notice, 11 February 2010

12 “CRU Scientific Assessment Panel announced”, UEA press notice, 22 March 2010

ensure the quality of evidence from research and evidence-based policy making. The letter requested a note on the recent events setting out:

- a) what had taken place;
- b) the steps that had been taken to investigate the allegations and to test the integrity of the data held and used by CRU;
- c) how CRU justified its commitment to academic transparency; and
- d) how the Vice-Chancellor proposed to restore confidence in CRU and its handling of data.¹³

The former Committee also asked for an assurance that none of the data referred to in the e-mails that had been publicised had been destroyed.¹⁴ UEA replied on 10 December 2009.¹⁵ In the light of the gravity of the allegations against CRU, the growing weight of damaging press coverage, on-going concerns about the deletion of data and the serious implications for UK science the former Committee decided to hold an inquiry into the disclosure of the data at CRU.¹⁶ One issue which the former Committee raised during the oral evidence session was the weight UEA attached to restoring its reputation¹⁷ in contrast to the other issues raised such as investigating the truth about the allegations made against the CRU.¹⁸

8. The former Committee decided to hold an inquiry into the disclosure of data from CRU and issued a call for evidence on 22 January 2010, with a deadline of 10 February for submissions. One oral evidence session was held on 1 March, when evidence was taken from:

- a) Rt Hon Lord Lawson of Blaby, Chairman, and Dr Benny Peiser, Director, Global Warming Policy Foundation (GWPF);
- b) Richard Thomas CBE, former Information Commissioner;
- c) Professor Edward Acton, Vice-Chancellor, UEA and Professor Phil Jones, Director of CRU;
- d) Sir Muir Russell, Head of the ICCER; and

13 HC (2009–10) 387–I, para 11

14 HC (2009–10) 387–I, para 11

15 HC (2009–10) 387–II, Ev 17

16 HC (2009–10) 387–I, para 12

17 HC (2009–10) 387–II, Q 152

18 The Committee noted the statement of the Vice-Chancellor of UEA made on 3 December 2009 in announcing the Independent Review that: "The reputation and integrity of UEA is of the utmost importance to us all. We want these allegations about CRU to be examined fully and independently. That is why I am delighted that Sir Muir has agreed to lead the Independent Review and he will have my and the rest of University's full support.", "Sir Muir Russell to head the Independent Review into the allegations against the Climatic Research Unit", UEA press notice, 3 December 2009

e) Professor John Beddington, Government Chief Scientific Adviser, Professor Julia Slingo OBE, Chief Scientist, Met Office, and Professor Bob Watson, Chief Scientist, Department for Environment, Food and Rural Affairs.

9. In the time available before the end of the Parliament, the former Committee's Report focussed on: the accuracy and availability of CRU's data, datasets and computer programming; the application of the Freedom of Information Act (FoIA); and the two independent inquiries announced by UEA.

10. The former Committee's main conclusions were set out in the Report summary:

The disclosure of climate data from the Climatic Research Unit (CRU) at the University of East Anglia (UEA) in November 2009 had the potential to damage the reputation of the climate science and the scientists involved.

We believe that the focus on CRU and Professor Phil Jones, Director of CRU, in particular, has largely been misplaced. Whilst we are concerned that the disclosed e-mails suggest a blunt refusal to share scientific data and methodologies with others, we can sympathise with Professor Jones, who must have found it frustrating to handle requests for data that he knew—or perceived—were motivated by a desire simply to undermine his work.

In the context of the sharing of data and methodologies, we consider that Professor Jones's actions were in line with common practice in the climate science community. It is not standard practice in climate science to publish the raw data and the computer code in academic papers. However, climate science is a matter of great importance and the quality of the science should be irreproachable. We therefore consider that climate scientists should take steps to make available all the data that support their work (including raw data) and full methodological workings (including the computer codes). Had both been available, many of the problems at UEA could have been avoided.

We are content that the phrases such as “trick” or “hiding the decline” were colloquial terms used in private e-mails and the balance of evidence is that they were not part of a systematic attempt to mislead. Likewise the evidence that we have seen does not suggest that Professor Jones was trying to subvert the peer review process. Academics should not be criticised for making informal comments on academic papers.

In the context of Freedom of Information (FOIA), much of the responsibility should lie with UEA. The disclosed e-mails appear to show a culture of non-disclosure at CRU and instances where information may have been deleted, to avoid disclosure. We found *prima facie* evidence to suggest that the UEA found ways to support the culture at CRU of resisting disclosure of information to climate change sceptics. The failure of UEA to grasp fully the potential damage to CRU and UEA by the non-disclosure of FOIA requests was regrettable. UEA needs to review its policy towards FOIA and re-assess how it can support academics whose expertise in this area is limited.

The Deputy Information Commissioner has given a clear indication that a breach of the Freedom of Information Act 2000 may have occurred but that a prosecution was timebarred; however no investigation has been carried out. In our view it is unsatisfactory to leave the matter unresolved. We conclude that the matter needs to be resolved conclusively—either by the Independent Climate Change Email Review or by the Information Commissioner.

We accept the independence of the Climate Change E-mail Review and recommend that the Review be open and transparent, taking oral evidence and conducting interviews in public wherever possible.

On 22 March UEA announced the Scientific Appraisal Panel to be chaired by Lord Oxburgh. This Panel should determine whether the work of CRU has been soundly built and it would be premature for us to pre-judge its work.¹⁹

11. The Report included a number of specific recommendations to the ICCER; a full list of these recommendations and the ICCER response is annexed to this report.²⁰

12. The Government also produced a response to the Committee's Report; this was published in September 2010.²¹

Our follow-up inquiry

13. The report by the SAP, chaired by Lord Oxburgh, was published on 14 April 2010. Although welcomed by most of the scientific community,²² it received some criticism for being rushed as the review took less than a month to complete.²³

14. The ICCER followed on 7 July 2010. The ICCER team, chaired by Sir Muir Russell, rejected two of the former Committee's recommendations; that he should hold oral evidence sessions in public and that UEA should not have advance knowledge of his conclusions before publication.²⁴ As with the SAP, there has been criticism in the press of the ICCER that:

- it did not adequately test the science;
- it only examined three instances of possible abuse of peer review, and just two cases when CRU researchers may have abused their roles as authors of Intergovernmental Panel on Climate Change (IPCC) reports;

19 HC (2009–10) 387–I, pp 3–4

20 Ev 35; and Annex: *The former Committee's recommendations and the ICCER response*

21 Department of Energy and Climate Change, *Government Response to the House of Commons Science and Technology Committee 8th Report of Session 2009–10: The disclosure of climate data from the Climatic Research Unit at the University of East Anglia*, Cm 7934, September 2010

22 For example, "Expert reaction to the Oxburgh report on UEA Climate Research Unit", Science Media Centre press notice, 14 April 2010

23 "Scientists cleared of malpractice in UEA's hacked emails inquiry", *The Guardian*, 14 April 2010, "'No malpractice' by climate unit", BBC website, 14 April 2010

24 Ev 35; and Annex: *The former Committee's recommendations and the ICCER response*

- it did not study hundreds of thousands more unpublished e-mails from the CRU;
- it failed to investigate whether e-mails were deleted to prevent their release under freedom of information laws;
- none of CRU's critics were interviewed by the two enquiries; and
- the membership of the Panel had excluded reputable critics of climate science.²⁵

15. We decided to carry out a short follow-up inquiry looking at how the SAP and ICCER addressed the points raised by the former Committee. Our primary objective was to focus on the adequacy of the two independent inquiries against the former Committee's original conclusions and recommendations. For this reason, we chose not to issue a call for evidence. We received, however, a number of unsolicited written submissions, which were taken into account, all of which have been published and are available online.²⁶

16. Two oral evidence sessions were held, the first with Lord Oxburgh on 8 September and the second on 27 October with Sir Muir Russell alongside Professor Edward Acton, Vice-Chancellor, and Professor Trevor Davies, Pro Vice-Chancellor for Research, UEA.

17. We would like to thank everyone who contributed to the inquiry through written submissions or oral evidence.

18. Our Report examines the way in which the two independent reviews were set up, how each team went about its task, and the key findings relating to:

- i. disclosure of data and methodologies;
- ii. peer review; and
- iii. freedom of information.

19. Finally, we have set out areas where further work is in progress.

25 For example, some of these criticisms are set out in "Without candour, we can't trust climate science", *New Scientist*, 14 July 2010 and Andrew Montford, "The Climategate Inquiries", *GWPF Report 1*, 2010.

26 Previously at www.publications.parliament.uk/pa/cm201011/cmselect/cmsstech/writev/444/contents.htm; upon publication of this report at www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/publications/

2 Setting up the independent reviews

The Scientific Assessment Panel (SAP)

20. In the UEA press release issued on 11 February 2010, Professor Davies said, in announcing the Scientific Assessment Panel (SAP), that “there should be an additional assessment considering the science itself”.²⁷ Professor Acton then explained to the former Committee in oral evidence on 1 March 2010 that the SAP was “to reassess the science and make sure there is nothing wrong”.²⁸ A subsequent UEA press release on 22 March 2010, announced that Lord Oxburgh would “chair an independent Scientific Assessment Panel to examine important elements of the published science of the Climatic Research Unit (CRU) at the University of East Anglia”.²⁹ Our predecessor Committee took the view that “reputation has to be built on the solid foundation of excellent, peer reviewed science” and that the review of the science to be carried out by the SAP, which was announced on 22 March, “should determine whether the work of CRU has been soundly built and it would be premature for us to pre-judge that review”.³⁰

21. The subtle change in language between 11 February and 22 March has been interpreted by some as a change in the purpose of the SAP from being about the “quality of the science” to the “integrity of the science”, i.e. from “was the science right?” to “was it carried out correctly?”.³¹ Lord Oxburgh explained to us that what Professor Acton had said on 1 March 2010 “was inaccurate”, and that the scope of the panel was made clear in the press notice issued on 22 March 2010 when the panel was appointed.³² The press notice Lord Oxburgh referred to stated that the panel would “examine important elements of the published science of the Climatic Research Unit (CRU) at the University of East Anglia”.³³ Lord Oxburgh explained how he took on the task:

I was visited in Cambridge by the deputy vice-chancellor and another senior member of the University, who wanted to persuade me to take this on. This had to be done rapidly. This was their concern. They really wanted something within a month, and there is no way that our panel could [...] validate the science. In fact, if you wanted the science validated you’d actually appoint a different panel. You probably wouldn’t appoint me as chairman, and you would actually need experts from the field, because it is a very different activity to see whether things are wrong from saying, “Yes, they’re right,” or “They have been done properly” or “improperly”. It is very different. It really is quite different. So I was quite clear. What we took on was

27 “New scientific assessment of climatic research publications announced”, UEA press notice, 11 February 2010

28 HC (2009–10) 387–II, Q 129

29 “CRU Scientific Assessment Panel announced”, UEA press notice, 22 March 2010

30 HC (2009–10) 387–II, para 131

31 Roger Harrabin, BBC Environmental Analyst, Radio 4 Today Programme, 7 July 2010, http://news.bbc.co.uk/today/hi/today/newsid_8795000/8795643.stm

32 Q 5

33 “CRU Scientific Assessment Panel announced”, UEA press notice, 22 March 2010

really to look at the integrity of the researchers, and we couldn't really have done anything different from that.³⁴

22. Professor Acton acknowledged that the phrase, “Look at the science and see if there is anything wrong” was open to different interpretations.³⁵ He appeared to us to question whether such a review would serve any purpose. He pointed out that reassessments of the scientific literature on climate change had been carried out recently in the US by both the National Research Council (part of the National Academy of Sciences and National Academy of Engineering)³⁶ and the Environmental Protection Agency.³⁷ He also made the point that, “the science published by the CRU is constantly being considered by colleagues across the world. That is the nature of science—that people have a great interest to test, examine and see if they can advance and refine work currently commanding the field”.³⁸

23. It is our view that the most reasonable interpretation of the UEA press notice of 11 February 2010 and the Vice-Chancellor's statement on 1 March 2010 was that the Scientific Assessment Panel would examine the quality of the science as well as the integrity. In the event, Lord Oxburgh and his colleagues on the Panel carried out a narrower inquiry that focussed on the Climatic Research Unit's methodologies and the integrity of the research. Had the scope and purpose of the SAP been made clear from the beginning of February it would have avoided much confusion and the inevitable allegation of manipulation.

The Independent Climate Change E-mails Review (ICCER)

24. The former Science and Technology Committee asked the ICCER team to consider whether its terms of reference needed revision. The Committee recommended:

With regards to the terms of reference of the Review, we consider that as well as measuring CRU against current acceptable scientific practice, the Review should also make recommendations on best practice to be followed by CRU in the future. We invite Sir Muir Russell to respond formally to our Report to the extent that he sets out whether, on the basis of its contents, he finds the Terms of Reference of his inquiry need to be changed.³⁹

25. In response, Sir Muir Russell stated: “The CCER has seen no need to amend its terms of reference. It notes in particular the Committee's wish to see the Review recommend future best practice. The Review has always understood its remit to include such recommendations, and therefore sees no need for any change in this respect.”⁴⁰ In the

34 Q 8

35 Q 51

36 Q51; National Research Council, *Advancing the Science of Climate Change*, 19 May 2010

37 Q51; Environmental Protection Agency, *Notice of Denial of the Petitions to Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases*, 29 July 2010

38 Q 55

39 HC (2009–10) 387–I, para 114

40 Ev 35, para 2; and Annex: *The former Committee's recommendations and the ICCER response*

event, the ICCER addressed issues of relevance to climate science in general and we deal with some of these issues in our Report. The general recommendations made by the ICCER to UEA about future best practice are outlined in paragraph 94 of this Report. The ICCER also makes specific recommendations about best practice in dealing with the storage of data (paragraph 55) and requests under the Freedom of Information Act (paragraph 87).

26. We accept that there was no need to amend the terms of reference of the Independent Climate Change E-mails Review, as recommendations on best practice were considered to be included within the remit of the review.

Coordination between the two reviews

27. Also of concern to our predecessor Committee was that there should be no unmanaged overlaps or gaps between the two reviews.⁴¹ Sir Muir Russell assured us that, “while respecting the fact that the two reviews were completely independent, CCER contacted Lord Oxburgh, Chair of the Scientific Appraisal Panel, to ensure that he was aware of the approach being taken by CCER to issues that might bear on his work.”⁴² Lord Oxburgh also acknowledged the importance of the independence of the two reviews.⁴³

41 HC (2009–10) 387–I, para 134

42 Ev 36, para 6; and Annex: *The former Committee's recommendations and the ICCER response*

43 Q 20

3 The programme of work

Timing

28. A criticism, made by the Global Warming Policy Foundation (GWPF), of the review by the Scientific Assessment Panel (SAP) was that it was “rushed and therefore extremely superficial. The body of the report is hardly five pages long. The Panel should have taken more time to arrive at more balanced and more trustworthy conclusions as there was no need to rush the inquiry.”⁴⁴

29. The press notice announcing the members of the Panel was issued on 22 March 2010 and indicated that the “panel will meet in Norwich in April and will have the opportunity to see original data and speak to those who did the work”.⁴⁵ The report was presented to UEA three weeks later, on 12 April 2010. This contrasts with the ICCER, which was announced on 3 December 2009 and reported seven months later, on 7 July 2010.

30. In its report the SAP stated:

The Panel worked by examining representative publications by members of the Unit and subsequently by making two visits to the University and interviewing and questioning members of the Unit. Not all the panel were present on both occasions but two members were present on both occasions to maintain continuity. About fifteen person/days were spent at the University discussing the Unit's work.⁴⁶

31. Lord Oxburgh elaborated in his evidence to us:

I don't think we could have done, usefully, any more than we did to answer the question that we were set. We worked very hard [...] I kept the panel together in Norwich while the report was written and while we went through a series of drafts, so you did not go through the endless iterative procedures [...] of circulating reports, getting a few comments here, getting them back, balancing them with someone else's opposing reports. We did it all around the table. So, actually, that probably saved six weeks over the normal procedures.⁴⁷

32. Lord Oxburgh's explanation for the brisk timetable would be understandable if there was a pressing deadline. In this case, as Lord Oxburgh explained, the urgency came from UEA, the report “had to be done rapidly [...] they [UEA] really wanted something within a month”.⁴⁸ Lord Oxburgh's statement could also be construed as indicating that the review was not operating wholly independently. Had the SAP been in less of a rush, they could have investigated the integrity of the science with more rigour, particular with regard to

44 “Another unsatisfactory rushed job”, GWPF press release, 14 April 2010

45 “CRU Scientific Assessment Panel announced”, UEA press notice, 22 March 2010

46 SAP report, para 2

47 Q 11

48 Q 8

CRU scientists' ability to repeat their own experimental work, an issue we discuss in paragraph 60.

33. The disparity in length between the SAP and ICCER reports is striking. When compared to the ICCER, the SAP report—a mere five pages—reads like an executive summary, with none of the detail of the ICCER. From Lord Oxburgh's evidence to us, the report does not appear to explain the detailed work carried out by the SAP. That in itself does not invalidate the SAP report but it does foster an impression that it was not as thorough as the ICCER and was produced quickly in an attempt to be helpful to UEA.

Accompanying documents

34. The SAP's decision not to publish accompanying working documents was also of concern to us, as these would have supplemented the Panel's review and more accurately reflected the work carried out. The working document of one SAP member, Professor Michael Kelly, Prince Philip Professor of Technology at the University of Cambridge, was published online and has received much attention from climate change debate websites.⁴⁹ This document highlight the "observations and concerns" of Professor Kelly, including comments such as:

I take real exception to having simulation runs described as experiments (without at least the qualification of 'computer' experiments). It does a disservice to centuries of real experimentation and allows simulations output to be considered as real data. This last is a very serious matter, as it can lead to the idea that real 'real data' might be wrong simply because it disagrees with the models! That is turning centuries of science on its head.

The reading of the papers was made rather harder by the quality of the diagrams, and the description of the vertical axes on a number of graphs. When numbers on the vertical axis go from -2 to +2 without being explicitly labelled as percentage deviations, temperature excursions, or scaled correlation coefficients, there is potential for confusion.

I think it is easy to see how peer review within tight networks can allow new orthodoxies to appear and get established that would not happen if papers were written for and peer reviewed by a wider audience. I have seen it happen elsewhere. This finding may indeed be an important outcome of the present review.⁵⁰

35. When we raised Professor Kelly's comments with Lord Oxburgh, he told us:

With Michael Kelly we discussed all of these things round the table with others, and I think you will see there a perfectly legitimate response of an engineer, a physical

49 For example, the Climate Audit website, <http://climateaudit.org/2010/06/22/kellys-comments/>

50 Professor Kelly's notes were available online (pp 81 and following): www.whatdotheyknow.com/request/35907/response/94112/attach/4/David%20Hand%20s%20attachments%20from%20emails%20supplied.pdf; in addition, they were submitted in a memorandum to the Committee—Ev W18

scientist, to looking at the work in an area of observational sciences. The language is very different. He, quite legitimately, says, “In our area we wouldn’t call these things experiments.”⁵¹

36. Following the oral evidence session, Lord Oxburgh added: “[Professor] Kelly’s observations [...] could, taken out of context, have been very misleading. They could be taken as a serious criticism directed at CRU when they are in fact a comment on the language and practice in climate science as a whole. They had no bearing on our inquiry into the scientific integrity of CRU”.⁵²

37. In analysing the SAP report, we note that Professor Kelly’s comments had been taken into consideration. For example, on the concerns raised about noisy data and selection bias, the report stated:

With very noisy data sets a great deal of judgement has to be used. Decisions have to be made on whether to omit pieces of data that appear to be aberrant. These are all matters of experience and judgement. The potential for misleading results arising from selection bias is very great in this area. It is regrettable that so few professional statisticians have been involved in this work because it is fundamentally statistical. Under such circumstances there must be an obligation on researchers to document the judgemental decisions they have made so that the work can in principle be replicated by others.⁵³

38. It appears to us that Professor Kelly’s comments were considered as part of a process, which included the views of other members of the SAP. The absence of the others’ working documents has resulted in attention focussing on Professor Kelly’s comments. We asked Lord Oxburgh whether it would have been better, for the sake of supporting what is a short report, to have published the SAP’s working documents. He replied: “I actually don’t think much would have been added. Again, we were working to time”.⁵⁴ In our view the effect of pressure of time, which apparently was a factor in the decision by the SAP not to publish supporting documents, was regrettable. In contrast, the ICCER published both written evidence and notes of oral evidence online.⁵⁵

39. In the interest of openness and transparency, supporting documents including the working documents of Professor Kelly and others on the Panel should have been made publicly available alongside the report and should now be made available. Unfortunately, Professor Kelly’s comments—which have been published in isolation online—can now be read out of context. Had these been published alongside the comments of the other Panel members with an outline of roundtable discussions we consider that this would not have been a problem. The importance of Professor Kelly’s

51 Q 27, note 2

52 Note by Lord Oxburgh added to oral evidence at Q 27

53 SAP report, para 6

54 Q 22

55 ICCER, Appendix 4 and www.cce-review.org/Evidence.php

work is that it clears CRU of deliberately falsifying their figures but, as the SAP report put it, “the potential for misleading results arising from selection bias is very great in this area”.

Oral hearings

40. Our predecessor Committee recommended that the ICCER’s oral hearings or interviews should be carried out in public wherever possible and that it should publish all the written evidence it received on its website.⁵⁶ The SAP was set up just as our predecessors published their Report, therefore no such recommendation was made directly to it. While we would have welcomed the openness of oral hearings by the SAP as well, it is unlikely that the rapid nature of the SAP inquiry would have accommodated this.

41. The ICCER written evidence received was indeed published online but the recommendation to conduct interviews publicly was rejected. Sir Muir explained:

What we wanted to do was to get the referenced scientific information down and findable rather than to rely on what people might say on the spur of the moment and have to go through the whole process of writing it up, checking it, modifying it and then going and finding the information. That is a perfectly valid technique for lots of other things, but we thought that this was so scientific, so objective, so much rooted in the references to what people had actually done as scientists, and whether the things that were complained of had influenced what they had done as scientists, that you really had to get after it by going to the record.⁵⁷

42. Our preference would have been, like our predecessors, for evidence to have been taken in public. We accept, however, that Sir Muir’s reasons for not doing this were reasonable. He chose to make detailed references of the scientific information relevant to what CRU scientists had actually done, in order to ensure that there was a robust written record. We do not consider, however, that this process would have been hampered by conducting the interviews in public.

Selection of publications

43. The Scientific Assessment Panel examined 11 CRU publications during the course of its investigations. The choice of publications has been widely discussed on climate change debate websites, with questions being raised about the extent to which the Royal Society were involved in the selection and whether or not Professor Jones at CRU was also involved.⁵⁸

44. Lord Oxburgh told us:

⁵⁶ HC (2009–10) 387–I, para 122

⁵⁷ Q 65

⁵⁸ For example, the Bishops Hill Blog, www.bishop-hill.net/blog/2010/4/16/actons-eleven-the-response.html

We [the Scientific Assessment Panel] didn't choose the 11 publications [...] The publications were suggested to us. They came via the University, but via the University and the Royal Society, I believe [...] There is no suggestion that Professor Jones chose them.⁵⁹

45. Professor Acton and Professor Davies explained that the starting point for the core publications suggested to Lord Oxburgh were the papers listed in the evidence given to our predecessor Committee.⁶⁰ They were chosen to address the criticisms of a number of areas of CRU research: the CRU global land temperature records; homogeneity adjustments; urbanisation effects; tree ring density records; and accusations of cherry-picking long records of tree growth.⁶¹ Professor Davies explained the role of the Royal Society in the selection process:

I and Peter Liss, the Acting Director of the Climatic Research Unit, had a verbal discussion with Lord Rees [President of the Royal Society] some time at the end of February, beginning of March. The list was sent to the Royal Society for approval or for further comment on 4 March. The Royal Society responded on 12 March saying that it was content with the list. I am aware of the fact that there are allegations in the blogosphere that the Royal Society responded within 20 minutes. That is not the case. It had the list for a week.⁶²

46. Professor Davies made it clear that Professor Jones was not involved in the selection of publications for the SAP.⁶³ We note that a number of other publications were referenced in CRU's submission to Sir Muir Russell, which the SAP also received.⁶⁴

47. This is at odds with Andrew Montford's submission:

The list of papers for Oxburgh did not include any of the key multiproxy temperature reconstructions. In his evidence, Professor Davies said that he disputed this, but this claim can be shown to be false. CRU has produced three multiproxy temperature reconstructions—Jones et al. 1998, Mann and Jones 2003, and Osborn and Briffa 2006. None were on the list of papers for the Oxburgh panel and Professor Davies offered no evidence to support a claim that they were.⁶⁵

48. Although it did not refer to the three papers identified by Mr Montford, we note that the SAP report did discuss proxy temperature reconstructions, specifically the dendroclimatology work at CRU. The SAP report stated:

59 Qq 29–30

60 Qq 56–57

61 Q 57

62 Q 58

63 Q 59

64 Q 82

65 Ev W12

CRU publications repeatedly emphasize the discrepancy between instrumental and tree-based proxy reconstructions of temperature during the late 20th century, but presentations of this work by the IPCC and others have sometimes neglected to highlight this issue.⁶⁶

Furthermore, the ICCER discussed the controversy surrounding multiproxy temperature reconstructions following the 1998 publication in *Nature* by Mann, Bradley, and Hughes (MBH98), who are not scientists at CRU.⁶⁷ The MBH98 paper, which sought to reconstruct historic temperatures back to 1400 AD, was first challenged in a peer-reviewed journal by Soon and Baliunas in 2003. We examine the ICCER's work on allegations of subversion of peer review in relation to the Soon and Baliunas paper, and others, in paragraphs 73 to 77.

49. In our view, the debate about the 11 publications examined by the Scientific Assessment Panel (SAP) is frustrating. While there is no doubt that the papers chosen were central to CRU's work and went to the heart of the criticisms directed at CRU, the allegations that certain areas of climate science such as key multiproxy temperature reconstructions were purposely overlooked could have been disregarded if the SAP had set out its process of selection in a more transparent manner.

Publication arrangements

50. Having taken oral evidence from Sir Muir Russell in March 2010, our predecessor Committee was concerned that, upon completing the review, conveying ICCER's findings to UEA in advance of publication would give the impression that UEA was being given an advantage when it came to responding.⁶⁸ ICCER responded:

The reason for this proposal appears to be that to do otherwise might put at risk the review's impartiality. There is no question of any contact with the University prior to publication that would influence the review's conclusions, as distinct from any necessary checking of factual matters. The Review was commissioned by the University to report on policies and practices within the University, and should the Review find matters of concern, then it clearly has a duty to inform the University. The Committee will also be aware that natural justice demands that both the University and members of CRU should be informed directly of any critical findings. Finally, it is also common practice in public and Parliamentary life for the subjects of reports to be given embargoed copies of the documents shortly before publication.⁶⁹

51. While we accept that it was not unreasonable for ICCER to inform UEA of the contents of its report in advance of publication, the fact is that this was open to misinterpretation.

66 SAP Report, para 7

67 ICCER pp 28-30

68 HC (2009-10) 387-I, para 113

69 Ev 36, para 7; and Annex: *The former Committee's recommendations and the ICCER response*

4 Key findings of the reviews

Disclosure of data and methodologies

52. The lack of transparency in disclosing raw data and the methodologies it used has been at the heart of many of the allegations against Professor Jones and others at the CRU at UEA. The specific allegations that most concerned our predecessor Committee were: that CRU inappropriately withheld data and methodologies used to create its temperature dataset, CRUTEM3; that CRU deliberately misrepresented its data; and that this amounted to scientific fraud. Our predecessor Committee examined these issues in March 2010 and recommended that the Independent Climate Change E-mails Review (ICCER) should “reach specific conclusions” on the issue of data availability.⁷⁰

53. On the allegations concerning temperature data, the ICCER concluded:

- Regarding data availability, there is no basis for the allegations that CRU prevented access to raw data. It was impossible for them to have done so.
- Regarding data adjustments, there is no basis for the allegation that CRU made adjustments to the data which had any significant effect upon global averages and through this fabricated evidence for recent warming.
- We find that CRU was unhelpful in dealing with requests for information to enable detailed replication of the CRUTEM analysis.
- Crucially, we find nothing in the behaviour on the part of CRU scientists that is the subject of the allegations dealt with in this Chapter to undermine the validity of their work.⁷¹

Raw data

54. Lord Oxburgh explained the importance of making raw data available in his oral evidence:

In making data available, it seems to me that a number of issues arose [...] none of the data that they [CRU] were really using today did they collect. So for all of those data, if people wanted them, the thing to do was to go to the people who generated them and actually get permission if they were not in the public domain already.⁷²

55. The ICCER recommended to UEA the provision of a formal metadata repository:

Whilst we recognize and accept that CRU relies on other bodies both nationally and internationally to provide and to archive basic weather station data, we believe that a

70 HC (2009–10) 387-I, para 39

71 ICCER, section 6.7

72 Q 43

formal approach to the storage and archiving of metadata is required. Such a repository would, for example, have made it far easier to respond quickly to requests for the list of station identifiers associated with particular CRUTEM datasets. Where a University is hosting a unit of such international significance, we believe that it should ensure funding is available for such a repository either through the research grant process or from central resources.⁷³

56. Professor Davies acknowledged that CRU did have “a case to answer, as many other climate scientists do—indeed, as all scientists in other areas do—of doing rather more to make [...] previous versions of data series, previous to publication, available for scrutiny”.⁷⁴ He later went on to announce that UEA would be investing in posts to help ensure that CRU’s data archive was efficient and that all previous versions of data series or metadata were readily accessible when requests come through.⁷⁵

57. Sir Muir Russell made the point to us that disclosure of data was necessary “for people to challenge science in the conventional way of building on the work that people have done, replicating it, challenging it, coming forward with new hypotheses”.⁷⁶

58. The disclosure of raw data and sufficient details of the computer programmes is paramount in encouraging people to question science in the conventional way, challenging existing work, enabling validation of it and coming forward with new hypotheses. We welcome the ICCER’s recommendation to UEA on the provision of a formal metadata repository, and are pleased that CRU is investing in posts to archive their data efficiently. We hope that no obstacles, financial or otherwise, will get in the way of CRU pursuing this.

CRU methodologies

59. Lord Oxburgh described the importance of disclosing enough detail of the methodologies used in coming to a conclusion, to allow others to validate the work:

One of the things that anyone handling large amounts of data would have wanted to do was to use their own techniques, which may be proprietary techniques which they have developed as part of their research. I think that when the observations, when the conclusions are published, there must be enough explanation and enough material [...] in order to allow another expert to come to the same conclusion or to disagree. You have got to have that availability, otherwise it doesn’t stand.⁷⁷

60. It is equally important for scientists to be able to replicate the work that they themselves have already carried out. However, when asked whether the scientists at CRU were able to make accurate reconstructions from the publication back to the raw data that they

73 ICCER, section 11.4

74 Q 83

75 Q 124

76 Q 61

77 Q 43

themselves had used, Lord Oxburgh answered “Not in every case. Not with the old material.”⁷⁸ When we pressed Professor Davies, he explained that:

On the question about replication, it is perfectly true, during the time that the Oxburgh Panel were at the Climatic Research Unit, that it was not possible to replicate all of the work that had been undertaken. Some of this work was undertaken 20-plus years ago and the data were not immediately accessible. I have spoken to colleagues in CRU and they assure me, and I am confident, that given time, a number of weeks or days, understandably, given the fact that this work goes back 20 or 30 years, then they can replicate their work.⁷⁹

61. Lord Oxburgh said that CRU was not able to make accurate reconstructions in every case, particularly of old material. Professor Davies from UEA confirmed this but said CRU scientists would be able to do this given a number of weeks. This is precisely the sort of work we would have expected the Scientific Assessment Panel to conduct—had it been less concerned about rushing to publish its report—during its inquiry into methodologies and the integrity of research at CRU.

The allegation of scientific fraud

62. In written evidence to our predecessors and to us, Mr Douglas Keenan made allegations of scientific fraud against a researcher at the University of Albany, Professor Wei-Chyung Wang, in relation to a 1990 paper on ‘Urban heat islands in China’.⁸⁰ Professor Jones had produced his own important paper on the effect of urbanization on temperature in 1990, including data from Professor Wang. This paper was cited in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report.⁸¹

63. The basis of the allegation was that meteorological stations located in rural areas can, over time find themselves in expanding urban areas. This potentially affects the temperature measurements made at those stations over a period of time, as urban areas could be warmer than rural areas. Mr Keenan said that the station location histories were not as reliable as suggested by Professor Jones and Professor Wang. The Global Warming Policy Foundation (GWPF) report, *The Climategate Inquiries*, stated that it has been claimed by Mr Keenan that, “even once Jones became aware of problems with Wang’s data, he failed to issue a correction to his paper and even continued to cite it, including in the IPCC’s Fourth Assessment Report [...] this amounts to scientific fraud”.⁸²

64. When we raised this allegation of fraud, Sir Muir Russell explained to us that he covered this issue in the ICCER, and that:

78 Q 34

79 Q 74

80 HC (2009–10) 387–II, Ev 181; Mr Keenan repeated the allegations in a memorandum—Ev W 12

81 Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis*, 2007, p 124

82 GWPF, *The Climategate Inquiries*, September 2010, para 65

Fraud implies that it was all deliberately set out to be done to conceal or to fabricate. I don't think that's the evidence of what people thought they were doing in 1990. Whether it should have taken 17 years for someone to spot it and whether, at the end of the day, the records weren't right so that you could set it right is another question. But, remember, Jones did another paper [...] to check the thing through.⁸³

The paper that Sir Muir refers to was written by Jones *et al.* in 2008.⁸⁴ This paper “verified the original conclusions [of the 1990 paper] showing that the precise location of weather stations was unimportant to the outcome”.⁸⁵ Professor Davies added that the State University of New York had fully investigated this allegation and that Professor Wang had been entirely exonerated.⁸⁶

65. Sir Muir Russell acknowledged it was “difficult” to investigate accusations of scientific fraud but added that making data available so that others could go through the process of checking scientific findings was “the best way” to “guard against fraud”.⁸⁷

66. We consider that data disclosed in publications should be accompanied by sufficient detail of computer programmes, specific methodology or techniques used to analyse the data, such that another expert could repeat the work. Providing the means for others to question science in this way will help guard against not only scientific fraud but also the spread of misinformation and unsustainable allegations.

Peer review

67. Following the disclosure of e-mails from the CRU, allegations were made that the scientists there had made improper attempts to influence the peer review process. Our predecessor Committee concluded that the operation of peer review was a critical issue and that the ICCER team needed to ensure that they had the relevant experience to deal with this.⁸⁸

68. Sir Muir Russell told us that he agreed with the Committee and had addressed this by “commissioning work from the editor of a leading peer review journal [Richard Horton, Editor of the *Lancet*] and from the Chair of the Committee on Publication Ethics [Elizabeth Wager] to ensure that Review members have a clear understanding of the relevant issues as they consider the evidence presented to them.”⁸⁹ He added that the scientific members of the Review team are fully aware of the importance and practice of peer review through their own extensive work.⁹⁰

83 Q 115

84 P. D. Jones, D. H. Lister and Q. Li, “Urbanisation effects in large-scale temperature records with an emphasis on China”, *Journal of Geophysical Research*, 2008, 113, (D16122)

85 ICCER, section 6.6

86 Q 116

87 Q 115

88 HC (2009–10) 387–I, para 119

89 Ev 35, para 3; and Annex: *The former Committee's recommendations and the ICCER response*

90 Ev 35, para 3; and Annex: *The former Committee's recommendations and the ICCER response*

69. Richard Horton provided *A brief history of peer review* to the Review team, in which he explained that:

Editors send manuscripts to reviewers based on a principle of confidentiality. The author expects the editor to maintain a covenant of trust between the two parties. The editor will not misuse the author's work by circulating it outside of the confidential peer review process. The editor expects that covenant of trust to be honoured by the peer reviewer. No manuscript should be passed to a third party by a reviewer without the permission of the editor, usually on the grounds of improving the quality of the critique of the manuscript by involving a colleague in the review process. A disclosure to a third party without the prior permission of the editor would be a serious violation of the peer review process—a breach of confidentiality.⁹¹

Confidentiality of peer review

70. The GWPF report, *The Climategate Inquiries*, put forward an example of a leaked document from CRU, which “appears to be a breach of peer review confidentiality”.⁹² This was the e-mail on 26 February 2004, in which Professor Jones contacted Professor Michael Mann at Pennsylvania State University, to discuss a paper he had apparently been shown by his CRU colleague, Dr Tim Osborne:

Can I ask you something in CONFIDENCE—don't email around, especially not to Keith and Tim here. Have you reviewed any papers recently for Science that say that MBH98 and MJ03 have underestimated variability in the millennial record—from models or from some low-freq proxy data. Just a yes or no will do. Tim is reviewing them—I want to make sure he takes my comments on board, but he wants to be squeaky clean with discussing them with others. So forget this email when you reply.

Cheers

Phil.⁹³

71. Sir Muir Russell told us that, although this was not one of the e-mails he investigated in detail, the author of the GWPF report used “tentative comments” such as this “it appears to be a breach” and that “you could equally read that e-mail and say there was a question put to [Professor] Jones rather than [his colleague] showing him the paper”.⁹⁴ Furthermore, Sir Muir denied the allegation in *The Climategate Inquiries* report that the ICCER “ignored the recommendation of their own [peer review] adviser that they investigate the possibility that CRU staff had breached the confidentiality of the peer review process”.⁹⁵

91 ICCER, Appendix 5, p137

92 GWPF, *The Climategate Inquiries*, September 2010, para 177

93 E-mail 1077829152.txt as taken from: GWPF, *The Climategate Inquiries*, September 2010, para 177

94 Q 107

95 GWPF, *The Climategate Inquiries*, September 2010, para 179; Q 107

72. We pressed Professor Davies on whether it was common practice for CRU scientists to discuss publications for peer review with colleagues. He told us:

I think all reviewers are well aware of the important issues of confidentiality, as Sir Muir has indicated. There will be a number of occasions, and I think this is accepted within the peer review community, where an individual reviewer is not expert in all areas which are covered by a particular publication. Certainly conversations will go on with colleagues in confidence, without revealing any details of data or results, about advice, about whether this, for example, is an appropriate methodology. I think that is within the spirit of peer review and doesn't break the conventions of peer review and confidentiality.⁹⁶

Subversion of peer review

73. The broader allegation investigated by the ICCER was that CRU made improper attempts to influence the peer review system, pressuring journals to reject submitted articles that did not support a particular view of climate change. The ICCER team assessed three specific examples of this, which we summarise as follows:

i. The Soon and Baliunas affair and *Climate Research*

Soon and Baliunas published a paper in the journal, *Climate Research*, reviewing 240 previous papers on temperature trends over the last millennium. Its claim, that recent temperatures were not unprecedented, was welcomed by those sceptical of anthropogenic global warming, but dismissed by other researchers on scientific grounds. The paper was accepted by one of the journal's Review Editors (Chris de Freitas) after peer review, but a number of other Review Editors resigned as a reaction against what they considered to be a seriously flawed paper. The Editor in Chief also resigned on being refused permission by the publisher to write an editorial on the failure of the peer review system. E-mails disclosed from CRU referring to this affair included the comment from Professor Jones to a colleague stating that he would have "nothing more to do with it [the *Climate Research* journal] until they rid themselves of this troublesome editor [de Freitas], a well known sceptic".⁹⁷ This led to allegations that normal procedures of publication were being undermined by CRU scientists.⁹⁸

ii. The conflict with Dr Boehmer-Christiansen

Dr Boehmer-Christiansen was editor of the scientific journal *Energy and Environment (E&E)*. She claimed that the hacked e-mails revealed attempts by CRU to manipulate peer review to *Energy and Environment's* disadvantage, and showed that libel threats were considered against its editorial team. She stated that "The emailers expressed anger over my publication of several papers that

96 Q 109

97 ICCER, section 8.3, para 6

98 ICCER, section 8.3

questioned the 'hockey stick' graph and the reliability of CRU temperature data. The desire to control the peer review process in their favour is expressed several times".⁹⁹

iii. Professor Briffa's editorship of *Holocene*

Professor Briffa's conduct as Editor of the journal, *Holocene*, was called into question by the disclosure of e-mails between him and various reviewers discussing whether or not a paper submitted to him should be rejected. The e-mail extract, "confidentially, I now need a hard and if required an extensive case for rejecting" has been widely discussed. This led to allegations that he attempted to reject submitted articles that did not support a particular view of climate change.¹⁰⁰

74. Having investigated these three examples, the ICCER concluded:

In our judgement none of the above instances represents subversion of the peer review process nor unreasonable attempts to influence the editorial policy of journals. It might be thought that this reflects a pattern of behaviour that is partial and aggressive, but we think it more plausible that it reflects the rough and tumble of interaction in an area of science that has become heavily contested and where strongly opposed and aggressively expressed positions have been taken up on both sides. The evidence from an editor of a journal in an often strongly contested area such as medicine suggests that such instances are common and that they do not in general threaten the integrity of peer review or publication.¹⁰¹

75. On questioning Sir Muir Russell about the choice of the three examples, he informed us that "they were the three that had been at the top of the head [...] in the comments that were made when the whole story broke [...] We couldn't do everything but we looked at three very solid accusations".¹⁰² He explained that the ICCER team were advised by their peer review adviser, Richard Horton, that it was "entirely natural that people should take a robust view about their own work" when peer reviewing the work of others with a different disposition.¹⁰³

76. Our predecessor Committee concluded that the evidence they saw did not suggest that Professor Jones was trying to subvert the peer review process and that academics should not be criticised for making informal comments on academic papers.¹⁰⁴

77. The conclusions reached by the Independent Climate Change E-mails Review (ICCER) are in line with our predecessor Committee's findings that "the evidence they saw did not suggest that Professor Jones was trying to subvert the peer review process

99 ICCER, section 8.4

100 ICCER, section 8.5

101 ICCER, section 8.6

102 Q 104

103 Q 105

104 HC (2009–10) 387–I, para 73

and that academics should not be criticised for making informal comments on academic papers”. We stand by this conclusion and are satisfied with the detailed analysis of the allegations by the ICCER.

Freedom of Information

78. It was alleged, by a number of correspondents who sent submissions to the ICCER team, that requests under the Freedom of Information Act 2000 (FoIA) and the Environmental Information Regulations (EIR)¹⁰⁵ had been inappropriately dealt with by UEA.

79. The FoIA, creating new rights of access to information, and the EIR, a statutory instrument providing access to environmental information, came into operation on 1 January 2005. CRU, as part of UEA, is classed as a “public authority” for the purposes of the FoIA and EIR. In his evidence to our predecessor Committee, Mr Richard Thomas, who was Information Commissioner from 2002 until June 2009, explained the application of the FoIA to scientific data held by UK universities:

the public must be satisfied that publicly-funded universities, as with any other public authority in receipt of public funding, are properly accountable, adopt systems of good governance and can inspire public trust and confidence in their work and operations [...] The fact that the FoIA requests relate to complex scientific data does not detract from this proposition or excuse non-compliance.¹⁰⁶

80. Mr David Holland was the author of several requests for information to UEA, some of which were allegedly mishandled. On 7 July 2010, the Information Commissioner’s Office (ICO) announced that the UEA “breached regulation 14(2) of the EIR by failing to provide a response to a request within 20 working days and breached regulation 5(2) by failing to provide a response to other requests”.¹⁰⁷ As Mr Holland indicated that he was “content not to proceed” with his complaint in relation to UEA’s failure to provide him with the information he had requested, “the Commissioner requires no further steps to be taken with regard to these requests”.¹⁰⁸

81. Mr Holland also made an allegation that the information he requested had been deleted, an offence under regulation 19 of the EIR.¹⁰⁹ The ICO decided that “although the emails referred to [...] indicated prima facie evidence of an offence, the Commissioner was

105 Environmental Information Regulations 2004 (SI 2004/3391)

106 HC (2009–10) 387–II, Ev 8, para 3.2

107 ICO Decision Notice concerning the Governing Body of University of East Anglia, 7 July 2010, Reference: FER0238017, www.ico.gov.uk/upload/documents/decisionnotices/2010/fer_0238017.pdf

108 ICO Decision Notice concerning the Governing Body of University of East Anglia, 7 July 2010, Reference: FER0238017, para 47

109 Environmental Information Regulations 2004 (SI 2004/3391)

unable to investigate because six months had passed since the potential offence was committed, a constraint placed on the legislation by the Magistrates Court Act 1980”.¹¹⁰

82. The Deputy Information Commissioner, Mr Graham Smith, previously explained to our predecessor Committee that the FoIA and EIR made it an offence for public authorities to act so as to prevent intentionally the disclosure of requested information.

83. Our predecessors concluded:

There is *prima facie* evidence that CRU has breached the Freedom of Information Act 2000. It would, however, be premature, without a thorough investigation affording each party the opportunity to make representations, to conclude that UEA was in breach of the Act. In our view, it is unsatisfactory to leave the matter unresolved simply because of the operation of the six-month time limit on the initiation of prosecutions. Much of the reputation of CRU hangs on the issue. We conclude that the matter needs to be resolved conclusively—either by the Independent Climate Change Email Review or by the Information Commissioner.¹¹¹

84. This matter was investigated by the ICCER, which found:

On the allegation that CRU does not appear to have acted in a way consistent with the spirit and intent of the FoIA or EIR, we find that there was unhelpfulness in responding to requests and evidence that e-mails might have been deleted in order to make them unavailable should a subsequent request be made for them.¹¹²

85. The ICCER also stated “there seems clear incitement to delete emails, although we have seen no evidence of any attempt to delete information in respect of a request already made.”¹¹³ We questioned Sir Muir Russell about what this statement meant. He explained that the e-mails “do still exist”;¹¹⁴ then went on to explain why the ICCER did not come to a conclusion on deliberate deletion of e-mails that had been requested:

The reason we didn't do that was something that I think I made clear to [the former Committee] [...] in March. I said I wasn't going to put the review into the position of making the sort of quasi-judicial prosecutorial, investigative judgments that Mr Thomas [...] had spoken about. That was an ICO's job. That was the position that we took. So, had we been going to get into this, we would have had to start asking questions under caution. We would have been doing the sort of investigative stuff, because you're getting to the point where you're alleging that there might have been an offence, and that really wasn't the thing that my inquiry was set up to do, especially when there is a parallel entity called ICO that has the investigative skills, the training and the background with its personnel.

110 ICO Decision Notice concerning the Governing Body of University of East Anglia, 7 July 2010, Reference: FER0238017, para 51

111 HC (2009–10) 387–I, para 93

112 ICCER, section 1.3.5

113 ICCER, section 10.5

114 Q 84

So that, in short order, was why we didn't go down the road of saying, "And did you delete things that had been requested?", because we felt that that would take us into an area where we would have had to operate under caution, and it wasn't actually relevant to where we had got to on the issue that all this is about, which is what was the end product of the influence that this process had on what was said in the IPCC report.¹¹⁵

86. Professor Acton had no such qualms questioning the scientists at CRU about whether or not they had deleted e-mails subject to FoI requests. He told us "Can those e-mails be produced? Yes, they can. Did those who might have deleted them say they deleted them? No. They say they did not".¹¹⁶

87. Despite not reaching an unequivocal conclusion about whether or not e-mails were deleted by CRU scientists in response to FoI requests, the ICCER did make specific recommendations to UEA on best practice in dealing with FoI requests in the future. These included: "promotion of the University's formal publication policy; incorporating more information on FoIA/EIR/DPA [Data Protection Act] responsibilities in the induction processes for new staff members; developing a rolling awareness campaign to focus the attention of established staff [...] and issuing annual reminders of the importance of transparency and of key FoIA/EIR/DPA responsibilities".¹¹⁷

88. Professor Acton acknowledged that there had been weaknesses in UEA's system, and in pockets of their culture, for dealing with requests for information but that he was keen for UEA to be "an exemplar" in improving the culture related to dealing with FoIA and EIR.¹¹⁸

89. We are concerned that the Independent Climate Change E-mails Review did not fully investigate the serious allegation relating to the deletion of e-mails. We find it unsatisfactory that we are left with a verbal reassurance from the Vice-Chancellor that the e-mails still exist. On the basis of the ICO's announcement made on 7 July 2010, it is reasonable to conclude that there was a breach of EIR by a failure to provide a response within 20 working days. On the allegation that e-mails were deleted to frustrate requests for information, a firm conclusion has proved elusive. UEA have accepted that there were weaknesses in their system, and in pockets of their culture, for dealing with requests for information. We are pleased that they are working towards rectifying this.

Application of FoI to scientific research

90. Lord Oxburgh noted that "there are very interesting questions to be asked about the interface between the Freedom of Information Act and scientific research in progress";¹¹⁹

115 Q 85

116 Q 95

117 ICCER, section 10.6, para 33

118 Q 102

119 Q 49

an issue also highlighted by the ICCER. The Review explained that there was confusion about how FoI legislation should be applied in terms of the materials developed during a research process, and that the American experience was instructive here:

The so called “Shelby Amendment” in 1998 directed the US “Office of Management & Budget (OMB)” to produce new standards requiring all data produced under Federally funded research to be made available under the US Freedom of Information Act. This resulted in great concern within the US Scientific community, expressed through Congressional testimony, that a very broad interpretation of this requirement could seriously impair scientific research and collaboration. In the final OMB guidelines, recognising these concerns, “research data” is defined as: *“the recorded factual material commonly accepted in the scientific community as necessary to validate research findings, but not any of the following: preliminary analyses, drafts of scientific papers, plans for future research, peer reviews, or communications with colleagues”*.¹²⁰

The Review recommended that the ICO should hold consultations on a similar distinction for UK FoI legislation.¹²¹

91. The current Information Commissioner, Mr Christopher Graham, wrote to us on 21 October 2010 explaining the interaction between the ICO and the ICCER, as well as progress made towards dealing with the problems presented in applying the FoIA to scientific research.¹²² Following a preliminary meeting on 22 July 2010 between the ICO and representatives from the Higher Education (HE) Sector, they agreed to organise a roundtable to begin work towards enhanced guidance for the sector on working within the FoIA and EIR. The roundtable discussion took place on 29 September 2010, and a note of the discussions was provided by the ICO.¹²³ The absence of a definition for “research data” in law was discussed, as well as the US experience. The outcome was that:

It was agreed to establish a working group representing the HE sector to work with the ICO in developing sector-led and sector-specific guidelines around the issues of research data, teaching materials and [Intellectual Property Rights].

After this work has been concluded, then the group might work with the ICO to inform any proposed amendments to the existing sector publication scheme in order to consider whether a framework for proactive dissemination of research data and /or teaching materials which still protected universities’ necessary interests might be feasible. Research council initiatives around open access might provide a model in these discussions.

120 ICCER, section 10.6, para 34

121 ICCER, section 10.6, para 34

122 Ev W7

123 Ev W8

The ICO and Universities UK, working with JISC [Joint Information Systems Committee], RIN [Research Information Network] and other key stakeholders, have agreed to take this process forward.¹²⁴

92. In addition to the work of the ICO, the Government Chief Scientific Adviser, Professor Sir John Beddington, told us that the Minister for Universities and Science, Rt Hon David Willetts MP, has asked him to examine the application of FoI to scientific research in more detail.¹²⁵

93. The broader confusion about how FoI legislation should be applied to scientific research must be resolved. The Information Commissioner's Office has made some progress, but this should now be pursued as a matter of urgency. The Government Chief Scientific Adviser will also be looking at this issue. We regard this matter as sufficiently serious that we want to see it resolved. We hope the Information Commissioner's Office will provide clear guidance on the application of FoI to scientific research by the start of the new academic year in September 2011.

124 Ev W11

125 Oral evidence taken on 27 October 2010, *The Government Office for Science Annual Review 2009*, HC (2010–11), 546–i, Q 26

5 Moving forward at UEA

94. The ICCER's main recommendations to UEA were:

- Risk management processes should be directed to ensuring top management engagement in areas which have the potential to impact the reputation of the university.
- Compliance with FoIA/EIR is the responsibility of UEA faculty leadership and ultimately the Vice-Chancellor. Where there is an organisation and documented system in place to handle information requests, this needs to be owned, supported and reinforced by University leadership.
- CRU should make available sufficient information, concurrent with any publications, to enable others to replicate their results.¹²⁶

95. UEA outlined what it was doing to address these recommendations in its formal response to the ICCER.¹²⁷ In evidence to us, Professor Acton highlighted some of UEA's work moving forward from the leaked e-mails incident:

In terms of restoring confidence, the critical thing is to have review after review after review to establish that they have found no shred of evidence that should shake confidence in their science. In terms of their [CRU's] integration, we have drawn them rather closer into the rest of the School of Environmental Sciences to ensure that all processes are run as they should be, notably FoI ones, that, were there any kind of repeat of that, they are dealt with absolutely as they should be and that there are none of the errors either of commission or omission that may have happened in the past. On the front of statistics, we are encouraging that they draw more closely on some of our professional statisticians and we may well also be investing in further posts in that area.¹²⁸

96. Professor Davies added: "We are also investing in posts to help CRU ensure that its data archive is efficient—that all of the previous versions of data series are in a readily accessible form so that when requests do come through for data series or for meta data as supporting data they will be more readily accessible and available than they have been hitherto."¹²⁹

97. Professor Sir John Beddington outlined the importance of transparency and openness: "climate science could, with merit, be more transparent, that data, where it is freely available, should be made available for people to look at it because it is such an important issue for policy".¹³⁰ He highlighted the Government Office for Science's website on climate

¹²⁶ ICCER, section 1.4

¹²⁷ Ev 28

¹²⁸ Q 124

¹²⁹ Q 124

¹³⁰ HC (2010–11) 546–i, Q 25

science, which we hope will prove a useful resource for those with an interest in the science of climate change.¹³¹

98. The disclosure of data from the Climatic Research Unit has been a traumatic and challenging experience for all involved and to the wider world of science. Much rests on the accuracy and integrity of climate science. This is an area where strong and opposing views are held. It is, however, important to bear in mind the considered view of the Government Chief Scientific Adviser, Professor Sir John Beddington, that “the general issues on overall global temperature, on sea level and so on, are all pretty unequivocal”.¹³² While we do have some reservations about the way in which UEA operated, the SAP review and the ICCER set out clear and sensible recommendations. In our view it is time to make the changes and improvements recommended and with greater openness and transparency move on.

131 www.bis.gov.uk/go-science/climatescience

132 Oral evidence taken on 27 October 2010, *The Government Office for Science Annual Review 2009*, HC (2010–11), 546–i, Q 25

Conclusions and recommendations

The Scientific Appraisal Panel (SAP)

1. It is our view that the most reasonable interpretation of the UEA press notice of 11 February 2010 and the Vice-Chancellor's statement on 1 March 2010 was that the Scientific Assessment Panel would examine the quality of the science as well as the integrity. In the event, Lord Oxburgh and his colleagues on the Panel carried out a narrower inquiry that focussed on the Climatic Research Unit's methodologies and the integrity of the research. Had the scope and purpose of the SAP been made clear from the beginning of February it would have avoided much confusion and the inevitable allegation of manipulation. (Paragraph 23)
2. We accept that there was no need to amend the terms of reference of the Independent Climate Change E-mails Review, as recommendations on best practice were considered to be included within the remit of the review. (Paragraph 26)
3. The disparity in length between the SAP and ICCER reports is striking. When compared to the ICCER, the SAP report—a mere five pages—reads like an executive summary, with none of the detail of the ICCER. From Lord Oxburgh's evidence to us, the report does not appear to explain the detailed work carried out by the SAP. That in itself does not invalidate the SAP report but it does foster an impression that it was not as thorough as the ICCER and was produced quickly in an attempt to be helpful to UEA. (Paragraph 33)
4. In the interest of openness and transparency, supporting documents including the working documents of Professor Kelly and others on the Panel should have been made publicly available alongside the report and should now be made available. Unfortunately, Professor Kelly's comments—which have been published in isolation online—can now be read out of context. Had these been published alongside the comments of the other Panel members with an outline of roundtable discussions we consider that this would not have been a problem. The importance of Professor Kelly's work is that it clears CRU of deliberately falsifying their figures but, as the SAP report put it, “the potential for misleading results arising from selection bias is very great in this area”. (Paragraph 39)

Oral hearings

5. Our preference would have been, like our predecessors, for evidence to have been taken in public. We accept, however, that Sir Muir's reasons for not doing this were reasonable. He chose to make detailed references of the scientific information relevant to what CRU scientists had actually done, in order to ensure that there was a robust written record. We do not consider, however, that this process would have been hampered by conducting the interviews in public. (Paragraph 42)

Selection of publications

6. In our view, the debate about the 11 publications examined by the Scientific Assessment Panel (SAP) is frustrating. While there is no doubt that the papers chosen were central to CRU's work and went to the heart of the criticisms directed at CRU, the allegations that certain areas of climate science such as key multiproxy temperature reconstructions were purposely overlooked could have been disregarded if the SAP had set out its process of selection in a more transparent manner. (Paragraph 49)

Publication arrangements

7. While we accept that it was not unreasonable for ICCER to inform UEA of the contents of its report in advance of publication, the fact is that this was open to misinterpretation. (Paragraph 51)

Disclosure of data and methodologies

8. The disclosure of raw data and sufficient details of the computer programmes is paramount in encouraging people to question science in the conventional way, challenging existing work, enabling validation of it and coming forward with new hypotheses. We welcome the ICCER's recommendation to UEA on the provision of a formal metadata repository, and are pleased that CRU is investing in posts to archive their data efficiently. We hope that no obstacles, financial or otherwise, will get in the way of CRU pursuing this. (Paragraph 58)
9. Lord Oxburgh said that CRU was not able to make accurate reconstructions in every case, particularly of old material. Professor Davies from UEA confirmed this but said CRU scientists would be able to do this given a number of weeks. This is precisely the sort of work we would have expected the Scientific Assessment Panel to conduct—had it been less concerned about rushing to publish its report—during its inquiry into methodologies and the integrity of research at CRU. (Paragraph 61)
10. We consider that data disclosed in publications should be accompanied by sufficient detail of computer programmes, specific methodology or techniques used to analyse the data, such that another expert could repeat the work. Providing the means for others to question science in this way will help guard against not only scientific fraud but also the spread of misinformation and unsustainable allegations. (Paragraph 66)

Peer review

11. The conclusions reached by the Independent Climate Change E-mails Review (ICCER) are in line with our predecessor Committee's findings that "the evidence they saw did not suggest that Professor Jones was trying to subvert the peer review process and that academics should not be criticised for making informal comments on academic papers". We stand by this conclusion and are satisfied with the detailed analysis of the allegations by the ICCER. (Paragraph 77)

Freedom of Information

12. We are concerned that the Independent Climate Change E-mails Review did not fully investigate the serious allegation relating to the deletion of e-mails. We find it unsatisfactory that we are left with a verbal reassurance from the Vice-Chancellor that the e-mails still exist. On the basis of the ICO's announcement made on 7 July 2010, it is reasonable to conclude that there was a breach of EIR by a failure to provide a response within 20 working days. On the allegation that e-mails were deleted to frustrate requests for information, a firm conclusion has proved elusive. UEA have accepted that there were weaknesses in their system, and in pockets of their culture, for dealing with requests for information. We are pleased that they are working towards rectifying this. (Paragraph 89)
13. The broader confusion about how FoI legislation should be applied to scientific research must be resolved. The Information Commissioner's Office has made some progress, but this should now be pursued as a matter of urgency. The Government Chief Scientific Adviser will also be looking at this issue. We regard this matter as sufficiently serious that we want to see it resolved. We hope the Information Commissioner's Office will provide clear guidance on the application of FoI to scientific research by the start of the new academic year in September 2011. (Paragraph 93)

Moving forward at UEA

14. The disclosure of data from the Climatic Research Unit has been a traumatic and challenging experience for all involved and to the wider world of science. Much rests on the accuracy and integrity of climate science. This is an area where strong and opposing views are held. It is, however, important to bear in mind the considered view of the Government Chief Scientific Adviser, Professor Sir John Beddington, that "the general issues on overall global temperature, on sea level and so on, are all pretty unequivocal". While we do have some reservations about the way in which UEA operated, the SAP review and the ICCER set out clear and sensible recommendations. In our view it is time to make the changes and improvements recommended and with greater openness and transparency move on. (Paragraph 98)

Annex: The former Committee's recommendations and the ICCER response

	Committee's conclusions and recommendations	Response from the Climate Change E-mails Review
1	We are not in a position to set out any further the extent, if any, to which CRU should have made the data available in the interests of transparency, and we hope that the Independent Climate Change Email Review will reach specific conclusions on this point. (Paragraph 39)	In accordance with its remit, the CCER will address the particular issues of data availability and peer review to which the Committee made reference.
2	The evidence that we have seen does not suggest that Professor Jones was trying to subvert the peer review process. Academics should not be criticised for making informal comments on academic papers. The Independent Climate Change Email Review should look in detail at all of these claims. (Paragraph 73)	
3	We accept the assurances that Sir Muir Russell has given about the independence of the Independent Climate Change Email Review and we expect him to be scrupulous in preserving its impartiality. (Paragraph 113)	The CCER welcomes the Committee's recognition that the Review is independent and that none of its members have links to the CRU or the IPCC.
4	With regards to the terms of reference of the Review, we consider that as well as measuring CRU against current acceptable scientific practice, the Review should also make recommendations on best practice to be followed by CRU in the future. We invite Sir Muir Russell to respond formally to our Report to the extent that he sets out whether, on the basis of its contents, he finds the Terms of Reference of his inquiry need to be changed. (Paragraph 114)	The CCER has seen no need to amend its terms of reference. It notes in particular the Committee's wish to see the Review recommend future best practice. The Review has always understood its remit to include such recommendations, and therefore sees no need for any change in this respect.
5	It is unfortunate that the Independent Review got off to a bad start with the necessary resignation of Dr Campbell. The question of the operation of peer review is going to be a critical issue in the inquiry and the Review Team needs to take steps to ensure the insight and experience he would have brought are replaced. (Paragraph 119)	The CCER agrees with the Committee on the importance of access to expertise concerning peer review. It has addressed this by commissioning work from the editor of a leading peer review journal and from the Chair of the Committee on Publication Ethics to ensure that Review members have a clear understanding of the relevant issues as they consider the evidence presented to them. It should also be remembered that the scientific members of the Review are fully aware of the importance and practice of peer review through their own extensive work.
6	We conclude that, when the Independent Review holds oral hearings or interviews, they should be carried out in public wherever possible and that it should publish all the written evidence it receives on its website as soon as possible. (Paragraph 122)	The CCER shares the Committee's wish for openness and transparency. It has published all submissions unless there are legal constraints such as defamation or copyright, or the submission is abusive. In these cases, the Review has sought the agreement of the author(s) on the means of enabling the submissions to be obtained directly by those wishing to see them.

	Committee's conclusions and recommendations	Response from the Climate Change E-mails Review
		The great bulk of the Review's process has been to deal with or canvass written evidence. Where interviews have taken place, the salient points have been noted and all the notes will be published.
7	The two reviews or inquiries need to map their activities to ensure that there are no unmanaged overlaps or gaps. If there are, the whole process could be undermined. (Paragraph 134)	The CCER noted the Committee's concern that there should be no unmanaged gaps or overlaps between its work and that of the Scientific Appraisal Panel. While respecting the fact that the two reviews were completely independent, CCER contacted Lord Oxburgh, Chair of the Scientific Appraisal Panel, to ensure that he was aware of the approach being taken by CCER to issues that might bear on his work.
8	We see no reason why the Review's conclusions and UEA's response have to be published together. Indeed, it could give the impression that UEA was being given an advantage when it comes to responding. We consider that the Review's conclusions and recommendations should not be conveyed to UEA in advance of publication. (Paragraph 113)	CCER notes the Committee's proposal that the conclusions of the review should not be conveyed to the University of East Anglia in advance of publication. The reason for this proposal appears to be that to do otherwise might put at risk the review's impartiality. There is no question of any contact with the University prior to publication that would influence the review's conclusions, as distinct from any necessary checking of factual matters. The Review was commissioned by the University to report on policies and practices within the University, and should the Review find matters of concern, then it clearly has a duty to inform the University. The Committee will also be aware that natural justice demands that both the University and members of CRU should be informed directly of any critical findings. Finally, it is also common practice in public and Parliamentary life for the subjects of reports to be given embargoed copies of the documents shortly before publication. The CCER is mindful of the Committee's recommendation, but it sees no reason to depart from normal practice.

Formal Minutes

Monday 17 January 2011

Members present:

Mr Andrew Miller, in the Chair

Gregg McClymont
Stephen Metcalfe

Stephen Mosley
Graham Stringer

Draft Report (*The Reviews into the Climatic Research Unit's E-mails at the University of East Anglia*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 97 read and agreed to.

Paragraph 98 read.

Amendment proposed, to leave out from “science” in line 3 to the end of the paragraph and add “There are proposals to increase worldwide taxation by up to a trillion dollars on the basis of climate science predictions. This is an area where strong and opposing views are held. The release of the e-mails from CRU at the University of East Anglia and the accusations that followed demanded independent and objective scrutiny by independent panels. This has not happened. The composition of the two panels has been criticised for having members who were over identified with the views of CRU. Lord Oxburgh as President of the Carbon Capture and Storage Association and Chairman of Falck Renewable appeared to have a conflict of interest. Lord Oxburgh himself was aware that this might lead to criticism. Similarly Professor Boulton as an ex colleague of CRU seemed wholly inappropriate to be a member of the Russell panel. No reputable scientist who was critical of CRU’s work was on the panel, and prominent and distinguished critics were not interviewed. The Oxburgh panel did not do as our predecessor committee had been promised, investigate the science, but only looked at the integrity of the researchers. With the exception of Professor Kelly’s notes other notes taken by members of the panel have not been published. This leaves a question mark against whether CRU science is reliable. The Oxburgh panel also did not look at CRU’s controversial work on the IPCC which is what has attracted most series allegations. Russell did not investigate the deletion of e-mails. We are now left after three investigations without a clear understanding of whether or not the CRU science is compromised.”.—(*Graham Stringer.*)

Question put, That the Amendment be made.

The Committee divided.

Ayes, 1
Graham Stringer

Noes, 3
Gregg McClymont
Stephen Metcalfe
Stephen Mosley

Paragraph 98 agreed to.

Annex and Summary agreed to.

Resolved, That the title of the Report be changed to the following: *The Reviews into the University of East Anglia's Climatic Research Unit's E-mails*. —(*The Chair.*)

Resolved, That the Report be the First Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

Written evidence was ordered to be reported to the House for printing with the Report, together with written evidence reported and ordered to be published on 14 July, 8 September, 13 October, and 24 November.

Written evidence was ordered to be reported to the House for placing in the Library and Parliamentary Archives.

[Adjourned till Wednesday 19 January 2011 at 9.10 am

Witnesses

Wednesday 8 September 2010

Page

Lord Oxburgh, Chair, Scientific Assessment Panel

Ev 1

Wednesday 27 October 2010

Sir Muir Russell, Head of the Independent Climate Change E-mails Review,
 Professor Edward Acton, Vice-Chancellor, University of East Anglia, and
 Professor Trevor Davies, Pro Vice-Chancellor for Research, University of East
 Anglia

Ev 8

List of printed written evidence

1	University of East Anglia (UEA Reviews 00 and 00a)	Ev 20, Ev 34
2	Lord Oxburgh (UEA Reviews 04)	Ev 35
3	Independent Climate Change E-mails Review (UEA Reviews 07)	Ev 35

List of additional written evidence

(Published in Volume II on the Committee's website www.parliament.uk/science)

1	David Holland (UEA Reviews 01, 01a and 01b)	Ev W1, Ev W3, Ev W15
2	Douglas J Keenan (UEA Reviews 02 and 02a)	Ev W5, Ev W12
3	Bob Critchlow (UEA Reviews 05)	Ev W5
4	Mr & Mrs L Black (UEA Reviews 06)	Ev W5
5	Information Commissioner (UEA Reviews 08)	Ev W7
6	Andrew Montford (UEA Reviews 09)	Ev W11
7	Graham Stringer MP (UEA Reviews 10)	Ev W18

List of Reports from the Committee during the current Parliament

Session 2010–11

First Special Report	The Legacy Report: Government Response to the Committee's Ninth Report of Session 2009–10	HC 370
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Oral evidence

Taken before the Science and Technology Committee on Wednesday 8 September 2010

Members present

Andrew Miller (Chair)

Stephen Metcalfe
Stephen Mosley
Pamela Nash

Alok Sharma
Graham Stringer
Roger Williams

Examination of Witness

Witness: Lord Oxburgh, Chair, Science Assessment Panel

Q1 Chair: As I said, we rapidly change subjects. Welcome, Lord Oxburgh, to our proceedings. I understand you have been a bit poorly, so thank you for maintaining the commitment to attend. I hope you are back to full health. The international panel was set up in consultation with the Royal Society. Can you explain to us how the panel was chosen and set up?

Lord Oxburgh: Perhaps it is worth beginning with a little bit of background. Would that be useful?

Chair: Of course.

Lord Oxburgh: As you know, the University of East Anglia set up a review under Sir Muir Russell in order to look into, initially, all aspects of the assertions which had been made about the Climatic Research Group. It became clear, I think, to the University in round about January/February of this year that they had asked Muir Russell to take on a much larger job than they had originally thought, and it was going to take quite a long time—probably six months or more—for Muir Russell to report. In the meantime, they had quite important domestic problems. They had a number of their academic staff about whom very serious allegations had been made, and they felt, really for the benefit of those individuals and the University, that this ought to be cleared up as quickly as possible. So I was approached in February to say would I chair a very brief study, really on the honesty of the people, not on all aspects of the science. We were not expected to go into the e-mail saga or what have you, but they really wanted to know whether there was any evidence that their people had been behaving dishonestly.

I was pretty reluctant to take this on because I had all sorts of other things planned but, in the end, I did. We put together a panel, in consultation with various people, of people who were outside the field. This was quite important because it is quite a small field, and if you look at the publications of the Climatic Research Unit they have collaborated with almost everyone in every climate department around the world. So it was quite difficult. But, basically, we wanted people who had no or as little as possible formal position on any of these questions but who, by and large, understood the methods and the techniques that were relevant to what was going on. So, ultimately, the choice of the panel members was mine, but I talked directly and indirectly to a number of people.

You will see that we ended up with only three people who had absolutely no connection with climate work, meteorology or anything of that kind—well, four, really, including me—and three people who were a bit closer to it. We had Lisa Graumlich, for example, who was a tree ring person, but had not used tree rings in the same way as the Climatic Research Unit used them. Basically, the traditional use of tree rings is for setting up chronologies—you know, the archaeological applications. What the Climatic Research Unit did was, of course, try and interpret the characteristics of these rings in terms of climate, and that is a different step and quite a difficult step to take. Similarly, the other two people who had some professional knowledge in the adjacent area would be Huw Davies and Kerry Emanuel, both of whom were meteorological people; meteorology is different from climate and has different problems but they understand the long words and so on. That was really how it was put together, but it was ultimately my decision.

Q2 Chair: One of the criticisms that has been made was that nobody on the panel appeared to have a predisposed position of being a climate sceptic. Why didn't you pick anyone of that ilk?

Lord Oxburgh: I think that it is not for me to comment on the private views of any member of the panel. I can tell you that at least one member of the panel had been active as a sceptic, but I am not going to go further than that. I think the views of individuals are their own.

Q3 Chair: So it would be your view that it is wrong to suggest that the panel was selected to have a particular point of view?

Lord Oxburgh: I certainly would. I think the panel was selected to have no point of view but, indeed, one of the panel members, when I approached him, demurred and said, "Really, I'm very doubtful about this. I don't believe in this." I said, "Oh, well, you're the sort of person we want," so I think the statement was unjustified.

Q4 Graham Stringer: Can I just follow through a point? You really said your Inquiry was about the integrity and honesty of the people involved?

Lord Oxburgh: As far as we could.

8 September 2010 Lord Oxburgh

Q5 Graham Stringer: When Professor Acton was before the previous Committee on 1 March this year, he said that your panel was “to re-assess the science and make sure there is nothing wrong.” That is a direct quote. Now, what you are saying is very different.

Lord Oxburgh: I think that was inaccurate, and I think that the scope of our panel was made quite clear in the University’s press release at the time that we were appointed and, indeed, in the first paragraphs of our panel report. I think you have to bear in mind that the vice-chancellor had been in post a month or something like that at the time. I think this all came as a rather unwelcome deluge in his first months as vice-chancellor.

Q6 Stephen Mosley: Can I come back on that a bit, because this is one of the key things that we are being told by the people who were kicking up a fuss: that the terms of reference have changed. The press release—

Lord Oxburgh: The terms of reference have not changed.

Q7 Stephen Mosley: I am sorry. That’s what they are claiming and that’s what we want to try and get to the bottom of.

Lord Oxburgh: Yes; sure.

Q8 Stephen Mosley: But the UEA press notice did say that it would be: “An independent external re-appraisal of the science in the CRU’s key publications.” Now, you are quite clear, from your opening statement and from your statement there, that you didn’t see it that way. Can we just try and drill to the bottom of why there is a slight difference between what the press release said and what the previous Committee was told?

Lord Oxburgh: I can’t comment on the recent report of other people saying things. Let me tell you I was visited in Cambridge by the deputy vice-chancellor and another senior member of the University, who wanted to persuade me to take this on. This had to be done rapidly. This was their concern. They really wanted something within a month, and there is no way that our panel could, if you like, validate the science. In fact, if you wanted the science validated you’d actually appoint a different panel.¹ You probably wouldn’t appoint me as chairman, and you would actually need experts from the field, because it is a very different activity to see whether things are wrong from saying, “Yes, they’re right,” or “They have been done properly” or “improperly”. It is very different. It really is quite different. So I was quite clear. What we took on was really to look at the integrity of the researchers, and we couldn’t really have done anything different from that.

Q9 Stephen Mosley: Okay. So who formally set the terms of reference for the panel? Was it yourself, the Royal Society or the University?

¹ Note by witness: Confirming the validity of scientific conclusions is a very different matter from determining whether those conclusions whatever they were, were reached honestly. I suspect that some of those who impute dishonesty to CRU really mean that they would have exercised judgement differently.

Lord Oxburgh: I think in the subsequent discussion assumptions have been made of a much more formal process than in fact happened. The terms of reference emerged from discussions in my house in Cambridge when the University explained what they wanted done, and they are effectively encapsulated in the first paragraph of our report. I don’t think there is any disagreement between me, our committee and the University on that.

Q10 Alok Sharma: Lord Oxburgh, you have made the point already that you were asked to try and do this fairly quickly—within a month.

Lord Oxburgh: Yes.

Q11 Alok Sharma: But how do you actually respond to the allegations that this report, which is ultimately only five pages long and took three weeks to produce, was rushed and actually pretty superficial?

Lord Oxburgh: I think that is for those who make that assertion to demonstrate. I know we have a tradition in this country of glacial rates of progress of commissions and panels of inquiry, but it is not something that I subscribe to. I don’t think we could have done, usefully, any more than we did to answer the question that we were set. We worked very hard, and I am afraid that I worked the panel very hard. They were very experienced people. Had we worked in a different way, the report would have taken, probably, two and a half months rather than one month. But, fundamentally, after we had done all the interviewing, talking and scrutiny, I kept the panel together in Norwich while the report was written and while we went through a series of drafts, so you did not go through the endless iterative procedures which you, as a Select Committee, must be familiar with, of circulating reports, getting a few comments here, getting them back, balancing them with someone else’s opposing reports. We did it all around the table. So, actually, that probably saved six weeks over the normal procedures. I think that explains it in terms of time put in, and activity put in. We would have gained nothing by taking any longer. I think if people feel it is superficial, it would be for them to demonstrate in what respect they think it was superficial.

Q12 Alok Sharma: I think we all appreciate that nobody wants to see glacial rates of progress when producing reports. But may I just clarify this point? You said you had all the members of the panel based up in Norwich.

Lord Oxburgh: All but one.

Q13 Alok Sharma: Okay. But does that mean that they were spending all their time on this report over that three-week period?

Lord Oxburgh: Not over two weeks but, probably, over four days, five days—something like that. They had done a lot before.

Q14 Alok Sharma: So how much time did each individual spend working on this report?

Lord Oxburgh: Gosh. You mean altogether, not just in Norwich?

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Q15 Alok Sharma: Yes. You said it happened over a three-week period and most of the time was spent in Norwich.

Lord Oxburgh: People had done an immense amount of work before they came. This is one of the important things. They had a fairly tough work schedule before they arrived, and then, in Norwich, when they were there, they worked continuously. I think we worked out that the total number of person days spent on this was around 15, something of that kind. It was significant. Does that answer your question?

Q16 Alok Sharma: Yes. The only comment I would make is that Sir Muir Russell's report took seven months and it just contrasts with the fact that yours took three weeks. But perhaps you feel that you spent enough time on it?

Lord Oxburgh: We were meeting a deadline. We were there for a purpose, to help the University with a particular problem. In fact, given our limited remit, I don't think we needed any more time.

Q17 Roger Williams: You have given us a clear understanding of the way the panel worked. But was the Panel involved in actually drawing up its programme of work and how it was going to work? What sort of standards do you apply to honesty? It seems to me you can apply a standard to science but you could be honest but incompetent, honest but misled. It seems a difficult task that you have set yourself almost.

Lord Oxburgh: That is a complicated question. We would have been—or the University—I would not say happy, but would have been content had we said the researchers there were incompetent but honest, misled but honest. We were looking for any evidence of deliberate manipulation of data, which really pointed in a different direction, in order to meet some predetermined aspect of an agenda. I have to say we found none.

You asked me at the beginning how the panel worked. Basically, until we got to Norwich, more or less, I laid down the way. I gave people jobs to do and things like that. We had a provisional work scheme before we got to Norwich. In fact, we changed that and the panel adapted its work method to the people that they were dealing with. One point I would make is that we were under quite a lot of press pressure, media pressure—to have them present and make the whole thing public. I was quite clear that it would be counter-productive to make this a media circus. People wanted to bring television cameras in and have it there. Given the nature of the individuals concerned, we felt that we would get much more out of them and get them to unwind and relax and, indeed, if they had chinks in their armour to expose them, if we did this in a much more relaxed and a much more easygoing way. I am confident that that was the right approach. I think that certainly one of the key people there was someone who was pretty highly strung, and in fact I think we were able to get him to relax and explain things. I think we understood pretty well.

Q18 Roger Williams: It seems to me that you have asked some very eminent people to do perhaps some fairly, I won't say bog standard but basic work.

Lord Oxburgh: Yes.

Q19 Roger Williams: Would it have been better, really, to use perhaps a team to do that work and report back to the group of people that you had gathered together?

Lord Oxburgh: I don't think so.

Q20 Roger Williams: What liaison or co-ordination did you carry out with Sir Muir Russell and his Inquiry?

Lord Oxburgh: Pretty virtually none. I felt that it was very important, given the assertions which were floating around of collusion, conspiracy and what have you, that we be absolutely independent. So until we actually finished, the communication with Muir Russell was entirely through the University.

Q21 Graham Stringer: The point you make about independence is interesting, Lord Oxburgh, because you said earlier that you wanted to help the University with a problem. Is that consistent with being independent? Was it prudent, really, as an independent body, to be based in the registrar's office?

Lord Oxburgh: We were not based in the registrar's office. We had held our meetings, I think, partly in a hotel and partly actually within the Climatic Research Unit premises. No, we were not. Let me make a comment on the University. I think quite a few assertions have been made about the University perhaps wanting a cover-up, or something of that kind. I have to say that, from everything I saw, the University wanted the story complete and completely unembellished. If the news was bad, they wanted to be the first to know. We were given complete freedom. No one tried to constrain us in any way. When we visited the research unit we asked for material, we asked for other publications, we asked for the raw material in certain cases. I would have to say that I don't think I have ever been in a more free and more open environment. The University just wanted it out. We had a sort of courtesy meeting with the deputy vice-chancellor or something in the registrar's office, but that was 10 minutes or something like that.

Q22 Graham Stringer: I don't think I have ever criticised a report for being too short before. You made the point earlier, and I listened carefully to what you said, about openness. I understand that. I don't necessarily agree because this area is so fraught with paranoia, quite frankly, from both sides. I have been sent a copy of Professor Kelly's notes on the 11 papers that were reviewed. Would it not have been good, for the sake of supporting evidence of what is a short report, to have at least published your working documents even if you didn't bring out the reports of the actual interviews?

Lord Oxburgh: I actually don't think much would have been added. Again, we were working to time. It could have done. Look, there are many ways of skinning a cat. Someone else doing this might have done it quite differently, but I am content with the

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way that we did it and I don't think I would do it differently again.

Q23 Graham Stringer: Having read Professor Kelly's notes, I don't really agree with you. If I can take one of his comments on one of Briffa's papers—

Lord Oxburgh: I don't think I have seen those recently. I probably saw them at the time, so you will have to indulge me, please.

Q24 Graham Stringer: I am not going to read them all out. I will give them to the Clerk afterwards. He says: "I take real exception at having simulation runs described as experiments (without at least the qualification of 'computer' experiments)."

Lord Oxburgh: Yes.

Q25 Graham Stringer: "This is turning centuries of science on its head." There are a lot of comments like that. "It is hard directly to correlate this aspect with the anthropogenic hypothesis of climate warming. Some features do correlate—others don't—so where is the rigorous tests of the significance of correlation or lack of it?" One could go on. I will pass these over to the Clerk.

Lord Oxburgh: That is okay. I remember that now.

Q26 Graham Stringer: There are others. The line between positive conclusions and the no hypothesis is very fine in my book.

Lord Oxburgh: Yes.

Q27 Graham Stringer: And it goes on to talk about how information is extracted. In trying to understand this incredibly important area, do you not think it would have been good to provide a lot of supporting documentation to the report?

Lord Oxburgh: I don't think it would have added very much. With Michael Kelly we discussed all of these things round the table with others, and I think you will see there a perfectly legitimate response of an engineer, a physical scientist, to looking at the work in an area of observational sciences. The language is very different. He, quite legitimately, says, "In our area we wouldn't call these things experiments." It is the common thing to do in this area of activity. So I actually don't think that that would have been particularly advantageous.²

Q28 Graham Stringer: You also talked about the integrity. One of the accusations made in the evidence to the predecessor committee of this was made by Keenan—

Lord Oxburgh: Made by?

Graham Stringer: Keenan, who accused Professor Jones of fraud.

Lord Oxburgh: Yes.

Graham Stringer: If you were trying to find out whether there was fraud going on or whether the

scientists had integrity, did you look at Keenan's accusations?

Lord Oxburgh: I don't recall doing so, if I did.

Q29 Graham Stringer: Can you tell us how you chose the 11 publications from the Climatic Research Unit?

Lord Oxburgh: We didn't choose the 11 publications. Basically, what I said that we needed was something which would provide a pretty good introduction to the work of the Unit as it had evolved over the years. The publications were suggested to us. They came via the University, but via the University and the Royal Society, I believe. Let me emphasise, they were just the start. Because all of us were novices in this area, I think we all felt that they gave us a very good introduction. From then we moved on. We looked at other publications. We asked for raw materials and things of that kind. The press seems to have made quite a meal of the choice of publications. I think for anyone on the panel this all seems a bit over the top because it didn't have that significance.

Q30 Graham Stringer: There are two things that arise out of that, aren't there? One, are you saying, because it says "small units," that Professor Jones, who was the subject, really, of this investigation, chose the papers themselves that were to be investigated and that wasn't the panel or the Royal Society?

Lord Oxburgh: No. There is no suggestion that Professor Jones chose them.

Q31 Graham Stringer: Then where did the lists come from?

Lord Oxburgh: I suspect that one of the people involved was Professor Liss, who was the acting head, I think, of the Unit, who had been brought in from outside the Unit to look after it. But he is a chemical oceanographer who is broadly interested in this area. I think he, in consultation with people in the Royal Society—and maybe others outside the Unit who had some familiarity with the area.

Q32 Graham Stringer: So the list did not come from the Unit? You are absolutely categorical on that?

Lord Oxburgh: I am sorry. The list?

Graham Stringer: The list did not come from the CRU?

Lord Oxburgh: I can't prove a negative, as you know. But we had absolutely no indication that it did.

Q33 Graham Stringer: Some of the publicity said that it came from the Royal Society, but the panel were given the list before the Royal Society was asked, weren't they?

Lord Oxburgh: Not as far as I know. You might be right but I don't believe so. No, certainly, I don't think that can be true.

Q34 Graham Stringer: I have just two final questions. When the panel was carrying out its appraisal were the scientists at CRU able to make accurate reconstructions from the publication back to the raw data that they themselves had used?

² Note by witness: Kelly's observations that were made in a private email to me could, taken out of context, have been very misleading. They could be taken as a serious criticism directed at CRU when they are in fact a comment on the language and practice in climate science as a whole. They had no bearing on our inquiry into the scientific integrity of CRU.

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Lord Oxburgh: Not in every case. Not with the old material.

Q35 Graham Stringer: You have surprised me over a number of things you have said, Lord Oxburgh. That is very surprising, isn't it?

Lord Oxburgh: I think it's undesirable but it isn't too surprising. This is perhaps one of the cultural differences between the work of the Unit and many of those who, I think, legitimately criticise it, who frequently come from an industrial background or an engineering background, where the culture and the patterns of working are very different—in which, particularly in industry, everything is documented. Your lab book contains everything that you have done and it is the property of the organisation, and when you leave it stays with the organisation. That is not always the practice in a university and particularly for work which is 15 or 20 years old, even if the material was properly recorded at the time, I think there are quite a few situations in which it would no longer be available today. People would just have said, "Well, that's all history. We'll throw that out." So you are quite right. Early work was not adequately documented and I'm not surprised, unfortunately.

Q36 Graham Stringer: Did Professor Jones say, when he was in the discussions, that it was actually impossible to reconstruct temperatures over the last thousand years?

Lord Oxburgh: I don't believe he said it, but it probably would have been true. Well, it depends what you mean by "reconstruct temperature over the last thousand years." I mean, the whole concept of a global temperature is actually a very subtle one. How do you decide what the temperature of the globe is? We know that all sorts of local circumstances associated with local weather are giving all sorts of small-scale variations. We know that most of the observations until the last century were based on land. Most of the land is in the northern hemisphere, so you had relatively few observations in the greater part of the surface. So actually deciding what a global temperature is is pretty darned difficult. You may be able to track temperature at a particular area, but how that relates to others is much more difficult.

I am fairly convinced by the work of Jones himself, which is based largely on instrumentation and instrumental records over the last 150 years, something of that kind. I think the instrumental records give us the best evidence there is. Then what you have got to do with those instrumental records, which are not distributed geographically, as you would really like, is to interpolate between them. You've got to then make extrapolations to the areas that you can't get to. So it is a pretty difficult business. That is why in the serious publications massive uncertainty bands are shown in the temperature reconstructions.

Q37 Pamela Nash: Lord Oxburgh, would it be accurate to say that the primary focus of the panel was the integrity of the scientists rather than the science?

Lord Oxburgh: I am sorry, but could you repeat the first bit again?

Pamela Nash: Would it be accurate to say that the focus of the panel was on the integrity of the scientists rather than the science?

Lord Oxburgh: Absolutely; yes.

Q38 Pamela Nash: The report suggests that the key task of the CRU was to analyse the data sets of others. However, the CRU scientists did not have the level of statistical skill to do this. Do you think that the CRU scientists are people of integrity but out of their depth when it comes to statistical analysis?

Lord Oxburgh: You are quite right. To the best of our knowledge CRU have not collected any of their own original data for a couple of decades, probably. All of their material comes from other sources of data collected by other people. We were quite critical of the way they handled some of this data. We were fortunate in having a very eminent statistician on our panel. He looked at pretty well all of that material very carefully. His conclusion was that they had not used state of the art methods to do—to solve/attack—what is essentially a statistical problem. You have got these dispersed data and you really have to manage this lot statistically. And he was really quite serious in saying that this was not the best way to do it. Having said that, even though they had adopted their own methods, he said, actually, had they used more sophisticated and state of the art methods, it wouldn't have made a great deal of difference.

So all of this reflects, if you like, a little bit on the competence of the people but not on their integrity.

Q39 Chair: Moving on to the memo, the e-mail of 16 November 1999 that we keep hearing repeated in various arenas, the sentence that has been commented on extensively, "I've just completed Mike's nature trick of adding real temps to each series for the last 20 years", etc, did you seek to interpret what was meant by it?

Lord Oxburgh: Let me start by saying I did not study the e-mails. We were told that Muir Russell was going to be looking at those carefully. But certainly I was aware of that from the attention it got in the newspapers and so on at the time. I looked up "trick" in the Oxford English Dictionary, actually, at that time, and, if I remember rightly, the Oxford English Dictionary gave it nine different meanings, one of which was "Special technique or way of doing something." I think, having looked at that, that anyone in the field reading that with an open mind, would actually take that meaning of the word "trick".

Q40 Chair: So you concluded that the approach that Professor Jones had adopted was one of dealing with presentation of the data rather than an attempt to deceive?

Lord Oxburgh: Absolutely. I think when you come to the presentation of complicated scientific observations and making them available to a much wider audience, you come up against some very tough "honesty" decisions. How much do you simplify? It is the same when you are teaching undergraduates. How much do you simplify in order to get a general idea across? I, personally, think that in various publications for public consumption those who have used the CRU

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data and those who have used other climatic data have not helped their case by failing to illuminate the very wide uncertainty band associated with it.

Q41 Stephen Metcalfe: Good morning. Accepting that you were there to look at the people rather than the science, and you said you thought you were all novices, you did look at some of the raw data?

Lord Oxburgh: Yes. We used it as a way of exposing them to a scrutiny of their methods, if you like.

Stephen Metcalfe: Yes.

Lord Oxburgh: It was getting them to take us through it.

Q42 Stephen Metcalfe: Did you find looking at that raw data useful? Because we had Professor Jones give evidence to the former Committee, and he said it wasn't standard practice for that evidence to be made available, published, to underpin the conclusions. Did you agree with that principle? Do you agree that that was the correct approach?

Lord Oxburgh: They are two separate questions. There was whether we found it useful or whether it should be made available.

Q43 Stephen Metcalfe: If you found it useful, then—

Lord Oxburgh: We found it educational. Put it that way. I have never actually examined tree rings under a high resolution microscope. I didn't know that they got darker towards the end of the year. So it was quite useful in that way.

In making data available, it seems to me that a number of issues arose in this, so can I widen it a little bit beyond what you have done? As we said a moment ago, none of the data that they were really using today did they collect. So for all of those data, if people wanted them, the thing to do was to go to the people who generated them and actually get permission if they were not in the public domain already.

When you move on beyond that, you move into a trickier area. One of the things that anyone handling large amounts of data would have wanted to do was to use their own techniques, which may be proprietary techniques which they have developed as part of their research. I think that when the observations, when the conclusions are published, there must be enough explanation and enough material of the kind you describe in order to allow another expert to come to the same conclusion or to disagree. You have got to have that availability, otherwise it doesn't stand.

Q44 Stephen Metcalfe: Right. So you think it would be a step forward to actually make that data available so that a peer review can take place, effectively?

Lord Oxburgh: I think for a peer review, even for a scientific journal, normally it would be available. I can well imagine a referee for a scientific journal saying, "Well, I can't assess this without seeing the data," and the editor then says, "Would you please send the data?" It doesn't mean it has to be published, but I can well imagine that would happen.

Q45 Stephen Metcalfe: But in your experience was it standard practice not to publish that data up until this point?

Lord Oxburgh: Again, things have changed because the nature of publication has changed so much during the last few years. Quite often now editors of journals are retaining archive material which is available for people to access, with reasonable cause, but is not actually published, which is probably a pretty good compromise.

Q46 Pamela Nash: The panel's report criticised the climate change sceptics. Could you tell us on what evidence this was based?

Lord Oxburgh: I am sorry. The panel?

Pamela Nash: The panel's report criticised climate change sceptics. What evidence was used to come to that conclusion?

Lord Oxburgh: I am not sure that we quite criticised climate change sceptics. Talking about climate change sceptics as a group is a bit like talking of members of the House of Lords as a group or, indeed, maybe the Commons as a group. Some of the people who carry the label "sceptic," I think, are extremely able and have actually done a really beneficial service to the science, particularly by going through a lot of the painstaking detail and discovering errors—sometimes important, sometimes not so important. This is clear, I think, in the blogosphere, although that, for reasons of preserving my blood pressure, I don't explore extensively. Then there are people who simply do not believe that anthropogenic climate change is possible. I was completely floored by an elderly lady, after I had given a talk on this sort of thing, and she said, "You're quite wrong." I said, "Well, thank you. I'm keen to know about that." She said, "It is totally presumptuous to think that human beings can have any influence on the Lord God's construction", and I didn't have an answer to that. But you have people who just have a gut feeling that human beings can't have this effect on climate.

Then you have others, particularly in north America but other parts of the world, who I think are probably funded by those commercial interests which are likely to be damaged if Governments take climate change policy seriously. I have to say that I would regard it as extraordinary if that didn't happen: if you look at the efforts of the tobacco lobby a decade and a half ago; if you look at what's going on in the United States at the moment over proposals based on health researchers' recommendations associated with the concentration of sugar in soft drinks, I think it is both expectable and reasonable for those whose businesses are going to be seriously influenced if Government policy changes to challenge them. I suspect that some of the methods of challenge are not very salubrious.

Q47 Pamela Nash: So how much damage do you think this latter group of sceptics that you have mentioned could do to climate change research and how should Government and academics then respond?

Lord Oxburgh: That is a very broad question. For something as important as climate change, let me just say that I would just love climate change to be proved wrong, because it is so, so important, and it is going

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to affect the way we live and the way we do things. So I would just love all of this to be proved irrelevant and that we didn't have to take any notice. I see no sign of that happening at the moment.

I think that, certainly, commercial lobbies have had a significant influence on undermining public confidence. I think probably the scientific community has been unduly patronising and arrogant in its presentation of its conclusions, and so I think there is some sort of balance to be found there. I think that Governments are not doing badly at the moment, but I think they simply have to plug on and take the best advice they can. The best advice doesn't really come from the fancy and complicated computer models which can be criticised or not. I've built these things myself in the past, and you believe in them honestly and sincerely yourself with enormous enthusiasm but you may have overlooked something. The fact is that a lot of the modelling from different groups in different parts of the world, based on different assumptions, all point in the same direction.

But actually there are more profound reasons for concern than the models. We are in the Thatcher Room at the moment, and I was sitting about as close as you are to me on the occasion when Mrs. Thatcher gave her astonishing green speech. I can't remember the words exactly, but she said, "We are performing an enormous experiment on our earth or on our environment, and that is really what's happening".

If we look at the behaviour of the planets, the four terrestrial planets Mercury, Venus, Earth and Mars, only two of those have got temperatures which really are above the temperature that you would expect at their distance from the Sun. Those are Venus, which has got an atmosphere almost entirely composed of CO₂, and Earth which has got an atmosphere with a little bit of CO₂. The whole idea of the greenhouse effect controlling the temperatures of the atmospheres of the terrestrial planets is a hundred years old. What that simple observation tells you is that if we increase the CO₂ in our atmosphere, we are actually into pretty uncertain territory. I suspect that the modelling is right

but although I don't believe it 100%, but I do believe that we are actually doing something pretty dangerous.

Q48 Chair: Finally, Lord Oxburgh have you seen a letter from the Secretary of State for Climate Change, Chris Huhne, to George Osborne, the Chancellor?

Lord Oxburgh: No, I haven't.

Chair: In that case, I can't ask you to comment on it.

Lord Oxburgh: But I want to see it.

Q49 Chair: No doubt you will. I don't think it is regarded as private. Assuming that I can release it to you, I would actually ask you for your comments on it.

I thank you for your frank answers. I think, clearly, there are lessons that can be

learnt, as you illustrated in your response to Pamela Nash. I think that this Committee and our sister Committee at your end of the corridor need to reflect on this.

Lord Oxburgh: If I may comment, I am no expert on the Freedom of Information Act but I do think that there are very interesting questions to be asked about the interface between the Freedom of Information Act and scientific research in progress, which either your Committee or our Committee might look at. I do find it extraordinary that any individual in any part of the world, with or without good cause, can cause people in this country to spend a great deal of time answering inquiries and so on. I think we haven't got it quite right yet, and I think that is, maybe, what Tony Blair meant in one of his comments recently in his book.

Q50 Chair: We are actually, of course, formally meeting your Committee in October. Perhaps that is one of the items that we could put on the agenda.

Lord Oxburgh: I think that would be very valuable.

Chair: Thank you very much for your attention.

Lord Oxburgh: My pleasure. Thank you.

Chair: Thank you everyone.

Wednesday 27 October 2010

Members present:

Andrew Miller (Chair)

Stephen Metcalfe
Stephen Mosley
Pamela Nash

Graham Stringer
Roger Williams

Examination of Witnesses

Witnesses: **Sir Muir Russell**, Head of the Independent Climate Change E-mails Review, **Professor Edward Acton**, Vice-Chancellor, University of East Anglia, and **Professor Trevor Davies**, Pro Vice Chancellor for Research, University of East Anglia, gave evidence.

Q51 Chair: Welcome, gentlemen. Thank you for agreeing to come. As you know, we are trying, in a sense, to tidy up loose ends from the work of our predecessor Committee. We are trying to bottom out some of the apparent contradictions in evidence that we have gathered. So we thought it appropriate to discuss this with you. If I may start with you, Professor Acton, you told our predecessor Committee in March that Lord Oxburgh's Panel was to reassess the science. In September of this year, Lord Oxburgh told us that that was inaccurate and the scope of his inquiry was clear in the university's press release issued on 22 March. Can we be absolutely clear from your point of view? Was the purpose of Lord Oxburgh's inquiry changed during March?

Professor Edward Acton: From my point of view, no, it wasn't. What I think I said to your predecessor Committee was that the purpose was to reassess the science and see if there was anything wrong. Having observed that this question might be raised, I wanted to check how your predecessor Committee had understood me. I was pleased to see that in the note, paragraph 131, your predecessor Committee says that what this panel should do is determine whether the work of CRU has been soundly built. That is exactly what I meant. Was it scientifically justified? In Lord Oxburgh's report he explicitly addresses that and says yes, it was scientifically justified. My sense is that that expression, "Look at the science and see if there is anything wrong", is open to a different interpretation. It may be that that is what some people had assumed contrary to the note in your predecessor's memorandum. I think they may have been thinking that what might have been at issue was a reassessment of the full body of scientific literature on climate change. Fortunately, that precise exercise has been carried out in parallel to the two independent committees I set up by the National Academy of Sciences. If Members have not read it, I would be very happy to send a copy. It is a very comprehensive overview.

Secondly, and somewhat later than that appearing in July, there is a very exhaustive analysis of various challenges to the current human understanding of climate science considered by the US Environmental Protection Agency, which goes into forensic detail on the e-mails. There the meaning is to look and see if there is anything arising from those e-mails that might make one look in a different way at the science. The conclusion is a resounding no. So it could be that

those who read my statement—"I would like this Committee to reassess the science and check if there is anything wrong"—stopped at the end of the word "science" and then thought, "Oh, it's what these two American bodies are going to do", which would have been a very, very major exercise.

Q52 Chair: So was there a lack of clarity there?

Professor Edward Acton: It seems to me that the word "science" is rather protean and we have in the current higher education discussion all sorts of anxieties about the different ways in which it is read. I think almost whenever you use it—and I wouldn't be surprised even in the course of this conversation—it is open to different interpretations.

Q53 Chair: Is the university satisfied with the way Lord Oxburgh conducted his inquiry?

Professor Edward Acton: Yes. I am very grateful to him and his eminent scientific colleagues for doing what we wanted them to do. I was interested in all their comments on public policy, on our own procedures and on that issue about some additional expertise in statistics. That is just the sort of thing that you might think a panel explicitly made up exclusively of scientists, unlike Sir Muir's Panel, might well comment on and did.

Q54 Chair: With hindsight would you have approached the external reappraisal of science differently?

Professor Edward Acton: I don't think so. For the avoidance of doubt and perhaps with guidance from people who understand the way in which science is read, there could have been some way of expressing this wish to see if there is anything wrong with the science in a manner that left no doubt in anybody's mind that I wasn't trying to shadow the EPA or shadow the National Academy of Sciences.

Q55 Chair: Finally, before I open it up to my colleagues, does the university consider that there is a need to commission an inquiry into the science published by the CRU?

Professor Edward Acton: In a way, I think that the science published by the CRU is constantly being considered by colleagues across the world. That is the nature of science—that people have a great interest to test, examine and see if they can advance and refine work currently commanding the field. I hope that will

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go on. I think it's in all of our interests that it be constantly pummelled—some separate thing, separate from what has been done in our two reviews and these two American reviews. I don't quite know what it would be.

Q56 Stephen Metcalfe: Good morning. Professor Acton and Professor Davies, Lord Oxburgh told us that the 11 publications that were the basis of his report were chosen by him but came via the university. Do you know who chose those 11 publications?

Professor Edward Acton: The core of them—I think possibly all of them—appear amongst those papers listed in the evidence that we gave to your predecessor Committee in our 3,000 words. It would seem very odd to draw Lord Oxburgh's eyes away from that list when they seemed to be bang on the issues at stake. I think there can be a premise that might slip into this kind of question area that imagines that UEA had a funny plan, which was to set up an independent review and then, immensely carefully, steer what it does. That is impossible. I have been looking into the history of eight European countries and I haven't discovered any university anywhere that has set up one, let alone two, independent inquiries to consider the allegations made against its scientists. The notion that one would do that and then somehow try to control the process is misguided. What I wanted was, is there anything wrong? I want to know.

Q57 Stephen Metcalfe: So that is a categoric no, the university was not involved in putting together that literature?

Professor Edward Acton: No, it is not at all a categorical no. On the contrary, Lord Oxburgh's Panel was keen to have a way into the subject, and consultation, including my Pro Vice Chancellor, led to the list, which of course was a starting point, as Lord Oxburgh said. It was not at all a case of, "Don't look at anything else", because there's rather a lot to look at. But Trevor?

Professor Trevor Davies: I took responsibility on behalf of the university for consulting with the Royal Society and with Lord Oxburgh over the starting point list for the Oxburgh inquiry and, as the Vice Chancellor says, the list was based on the references which were in the submission to your predecessor Committee. They were chosen to address what was then the huge unfounded criticism of a number of areas: the CRU global land temperature records, so there were two publications from that area; homogeneity adjustments—two publications from that area; urbanisation effects—two publications from that area; tree ring density records—three publications from that area; and then accusations of cherry-picking long records of tree growth, and there were two articles from that area.

I would like to stress that the Oxburgh Panel was also sent other information. For example, it was sent our submission to this predecessor Committee. It was also sent the submission to the Muir Russell review, where Muir Russell asked the Climatic Research Unit to address a number of questions based on criticisms. That was a 78-page submission and much of that submission was couched in scientific terms. That was

sent to the Oxburgh Panel, and that submission to the Muir Russell review included references to 70-odd Climatic Research Unit publications. The Oxburgh Panel was told that those publications were readily available for them to access.

Q58 Stephen Metcalfe: At what point was the Royal Society asked to approve the list? Was that before or after it had been sent to the Oxburgh Panel?

Professor Trevor Davies: I and Peter Liss, the Acting Director of the Climatic Research Unit, had a verbal discussion with Lord Rees some time at the end of February, beginning of March. The list was sent to the Royal Society for approval or for further comment on 4 March. The Royal Society responded on 12 March saying that it was content with the list. I am aware of the fact that there are allegations in the blogosphere that the Royal Society responded within 20 minutes. That is not the case. It had the list for a week. Indeed, the anticipated list, as the discussion with the Royal Society was going on, was posted on our website. On our website we indicated that the starting point reading list for the Oxburgh Panel would likely be based on our submission to your predecessor Committee. That was posted on our website on 22 March, and there were no objections that we were aware of at that point. Objections, or claims about the fact that the publications were chosen selectively, were made after the event.

Q59 Stephen Metcalfe: Was Professor Jones involved in the selection of those documents at all?

Professor Trevor Davies: No, not for the Oxburgh Panel. The discussions were internally at UEA between me and Professor Liss. Professor Jones and his colleagues were told which publications would be sent in and would be recommended to the Oxburgh Panel, but they had no decision-making role at all.

Q60 Stephen Metcalfe: Do you consider that that process was open and transparent, or do you think it should have been open and transparent so that people could understand how you got to that particular selection?

Professor Trevor Davies: It was an open and transparent discussion with the Royal Society. Anybody was at liberty to make suggestions about which publications should be considered by the Oxburgh Panel, as indeed they were by the Muir Russell Review.

Q61 Roger Williams: Can I ask Sir Muir about the work programme that was undertaken? I understand from your review that you said it was not your intention to look at each individual e-mail and try to divine its meaning and intention but to look at the whole body, including the hacked e-mail exchanges and other e-mail exchanges, and just see whether it was not at odds with acceptable scientific practice. Did you actually read all the e-mails?

Sir Muir Russell: Yes. As we say in chapter 4, there are 3,300 pages of them when you print them out. When you run them over the screen, you get pretty cross-eyed by the end of it, but the answer is yes. When we started there was quite a body of comment

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and opinion out there over what all this meant, and we produced what we called an “Issues Paper”, which is one of the appendices to the report, which attempted to begin to focus on what the key points seemed to be. We gave everybody the opportunity to make submissions about those but also to comment on whether there were other issues. It was pretty clear that we were on the main set of things in that original Issues Paper.

You are absolutely right to say that the way the teams worked developed. We didn’t find ourselves going after every detail of the wording of every e-mail. Instead, we tried to look at what we thought were the big issues. We looked at the question about the way in which data had been handled; had it been concealed; was there a reason to be suspicious about that? We looked at the way in which tree data had been handled and whether it had been selected in a way that would have given a particular pre-determined result. We looked at peer review where there had been a lot of comment. We looked at whether the two named individuals had exercised undue influence on the conclusions of a chapter of the IPCC in ways that then fed into the overview for policymakers. So at that level we were looking at what they were doing. We were looking at what we termed in our final report “their honesty and rigour as scientists”. You know that our conclusion was that none of those things that we looked at challenged that. We looked at their operations in terms of FOI, in terms of environmental impact regulations, the way in which they handled the research management within the university and the way in which they handled data in the university. We found rather a lot to say about that. You will find that the Vice Chancellor, Professor Davies and their colleagues have been working quite hard on that.

Then the third thing that we distilled out of that original Issues Paper and the comments we got was a feeling that there was a set of really quite high-level issues that we wanted people to think about. One was the availability of data from researchers in the middle or near the end of their work, just how that should actually be handled and the relationship there with the Information Commissioner. There was a precedent case involving Queen’s in Belfast. There was American input about how they had tried this and how they had settled on a particular balanced position. So we said that that was one thing to look at for the future. There was the whole issue of peer review, and I think that our essay in the report added quite a bit to people’s general understanding of that peer review. There is the great joke about it’s being the worst until you look at the alternative systems but it has a lot of pluses. It has some minuses.

We looked at the communication of science in this modern, unmoderated blog-driven world, and we said that scientists need to think rather more carefully about how they handle their responses in the world in which they operate. Learned societies and others need to think about all of that. So we were trying to set a general agenda. I think one of the things that we did seek to demonstrate—it comes back to your basic question about whether we looked at all the e-mails—I think one of the conclusions I would draw from what we said was that, really, the thing that needs to happen

now is for people to challenge science in the conventional way of building on the work that people have done, replicating it, challenging it, coming forward with new hypotheses, and the data need to be available to make that happen. That is the way in which, I would submit, and I am not a climate scientist, climate science should develop. That, in a sense, is a move on from the very specific information that is in this particular set of e-mails and it moves you into the world that the Vice Chancellor has talked about with these worldwide reviews. There is a big picture there developing. I think that what we said about how you should do that is a contribution to developing that big picture.

I am sorry for the long answer, but you can see how we moved from quite specific to a fairly general set of propositions.

Q62 Roger Williams: But on the specific again, you say you read all the e-mails, and we obviously accept that, but was that the case for all the members of your review team as well?

Sir Muir Russell: Yes.

Q63 Roger Williams: Could then I ask, how many interviews were held with the Unit’s staff? Did you and the full team attend those interviews?

Sir Muir Russell: I think that the interview schedule is set out in one of the appendices of the report, so you probably know the answer before I give it. Certainly we did not all attend all the interviews. I know that has been one of the points of criticism, but I just invite you to consider how one could possibly have arranged a schedule which would have had all the members of the team, supporters and so on attending everything. It would not have worked, so we broke up the work. Some of us took particular areas and particular opportunities to see people. Of course you need to remember that it wasn’t just interviews. There was a huge amount of to-ing and fro-ing following up the points that people had made.

One of the things I want to stress—and it goes back, in a way, to something that Professor Davies said—is that what we were trying to do was to get people to write down and reference the evidence of the work that they had done, the scientific papers they had produced and what people had made of them, rather than sitting blandly and asserting something which we would solemnly write down and that would be evidence. No, the evidence was what they had done as scientists and how that was referenced. So you find the submissions are full of references, you find the follow-ups are full of them, you find the report is full of them, and I am quite comfortable with the notion that that was what we were trying to do. So there is a tremendous quarry here, in the report, on the website and in the references that it gives of things that people can go to and say, “This is what they were doing. Was it a secret? Had they made it clear in their paper? Had their paper been published? Had it been properly reviewed?” So that was the approach we took. That is why the interviews as such were not great set pieces, but we did record them—by “record”, I mean write up, not record the way this is being recorded—so that people could check that they were being fairly

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represented and that the references and points that we were taking from it were the balance of the argument that they wanted to give.

Q64 Roger Williams: But you could understand from a public perception point of view that this was such an important inquiry because it went to the basis of some science that is really fundamental to the future of this planet in a way. These interviews, where you actually see somebody face-to-face and ask difficult questions, are a key to this process. Would you have liked to do it any differently if you had a chance to reflect upon it in hindsight?

Sir Muir Russell: I don't think so. I and the team were pressed fairly hard on this point both in your predecessor Committee and by particular people in correspondence. We decided that we wanted to do what I have essentially explained. I don't think we were short-changing the quality of the information, the argument or the analysis in doing that. It is all there for people to see. If people want to say, "That bit of science is wrong. That was the wrong reference", it is all there for them to take on board and do it. So I am quite comfortable that it has served that particular purpose.

Q65 Roger Williams: One of the things that the previous Committee recommended was that these interviews took place in public. Why didn't you follow that recommendation?

Sir Muir Russell: For the reason that I have implied in what I have said—that what we wanted to do was to get the referenced scientific information down and findable rather than to rely on what people might say on the spur of the moment and have to go through the whole process of writing it up, checking it, modifying it and then going and finding the information. That is a perfectly valid technique for lots of other things, but we thought that this was so scientific, so objective, so much rooted in the references to what people had actually done as scientists, and whether the things that were complained of had influenced what they had done as scientists, that you really had to get after it by going to the record. This was the way we chose to do it. I am reminded that there were 26 interviews, which is what is in the list, plus there were some telephone interviews that were written up and the record was then shared with the person who had given the interview so that it was regarded as just as sound and as valid as one that had happened face-to-face where we sent back our notes.

Chair: I would now like to move on to the issues around e-mails and their deletion.

Q66 Graham Stringer: Can I just go back to Professor Acton's first answer because I would like to follow up on one question? You said you were satisfied with the Oxburgh Report, Professor Acton. When Lord Oxburgh was here, he commented on Professor Kelly's notes that he made during the interviews. Some of those notes that Professor Kelly made, while there was no smoking gun that anybody had fiddled the figures—that was absolutely clear—he did say that he didn't think some of the things that the CRU was doing was science as he understood it, if I

can paraphrase. Do you not think that the Oxburgh Report would have been better had it contained that, particularly as Oxburgh himself said that Briffa couldn't even reproduce his own work, and if you can't even reproduce your own work, it's not challengeable by other scientists, is it?¹

Professor Edward Acton: I am sorry, but is the last bit the question?

Q67 Graham Stringer: What I am really asking is: was the Oxburgh Report not bowdlerised really? Wouldn't it have been better with Professor Kelly's comments about his criticism of the scientific method as used by that team?

Professor Edward Acton: I am a historian. I think there are differences between some scientific traditions. My understanding is that Professor Kelly's comments, which I could not relate to in any detail, partly reflect that fact. I think, for my purpose, what I wanted to know was whether that panel of extremely strong-minded, independent scientists found anything scientifically unjustified here, and they found nothing, so I feel content.

Q68 Graham Stringer: Can I use Russell, then, against Oxburgh on this, because in paragraph 25 in your report you make a very good statement about science and that it should be challengeable. I don't really agree with you, Professor Acton. You are a historian, not a scientist, but the nature of all science has to be—and I think Sir Muir put this into his report—recorded, reproducible and challengeable. I don't believe that climate science is any different from that, is it?

Professor Edward Acton: I wouldn't have thought so. My understanding—

Q69 Graham Stringer: Then can I go back to the original question. If it isn't, wouldn't it have been good to put Professor Kelly's comments about what he thought were the scientific inadequacies of what was going on, not fiddling but just scientific inadequacies in the method, and also Lord Oxburgh's comments that Briffa couldn't produce his own work?

Professor Edward Acton: Would it have been good to do what with those?

Q70 Graham Stringer: To put it into the report, either as annexes or appendices?

Professor Edward Acton: Well, Lord Oxburgh was independent. I wasn't going to say, "Now, I think you should add this or do anything". He was independent.

Q71 Graham Stringer: Yes, he was independent.

Professor Edward Acton: So it was entirely up to him.

Q72 Graham Stringer: I am asking you as the Vice Chancellor who responded to these reports.

Professor Edward Acton: Yes. Do I think he should have written more? I wouldn't want to criticise him. I think he did a very good job of work.

¹ See ev 34

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Q73 Graham Stringer: Right. So you're satisfied that not all the information was out from that inquiry?

Professor Edward Acton: It would astonish me if the report included all the notes made by all the individual members.

Q74 Graham Stringer: These were pretty fundamental criticisms of the methodology.

Professor Trevor Davies: May I add something, Mr. Stringer? I think you are possibly referring to Professor Kelly's objection to the use of a word like "experiments" in climate science when his notion of an experiment is a closely controlled exercise. It is standard terminology in climate science that such computer simulations that others were referring to are called "experiments".

On the question about replication, it is perfectly true, during the time that the Oxburgh Panel were at the Climatic Research Unit, that it was not possible to replicate all of the work that had been undertaken. Some of this work was undertaken 20-plus years ago and the data were not immediately accessible. I have spoken to colleagues in CRU and they assure me, and I am confident, that given time, a number of weeks or days, understandably, given the fact that this work goes back 20 or 30 years, then they can replicate their work.

Q75 Graham Stringer: That was not what this Committee was told. Did you used to be part of CRU, Professor Davies?

Professor Trevor Davies: I'm sorry?

Q76 Graham Stringer: Were you part of CRU at any stage?

Professor Trevor Davies: Yes. I was a Director of CRU for a five-year period.

Q77 Graham Stringer: You were a Director of CRU; right. If we can go back, then, to the responses you made about the selection of the 11 papers, in the Climate Change Inquiry Montford paper, he quotes on page 31 an e-mail from you to the Royal Society. Is that an accurate reflection of the e-mail you sent to the Royal Society?

Professor Trevor Davies: Which was?

Q78 Graham Stringer: It says: "I would be very grateful if you would be prepared to allow us to use a form of words along the lines: 'the publications were chosen in consultation with the Royal Society.'"

Professor Trevor Davies: Yes, that is right. That was after a conversation with Lord Oxburgh. That e-mail was sent on 12 March, I believe. That was a follow-up to an e-mail and the proposed list of publications which were based largely on the submission to the predecessor Committee, which I sent on 4 March.

Q79 Graham Stringer: So two days after the panel had got the papers you were writing to the Royal Society saying that you would be grateful if you could be allowed to use a form of words that the publications were chosen in consultation with the Royal Society, when they'd actually already been chosen?

Professor Trevor Davies: No, no. They were sent to the panel members on 10 March.

Q80 Graham Stringer: Yes, but this e-mail, we have agreed, is the 12 March. It is two days later, isn't it?

Professor Trevor Davies: Yes. That is because in conversation with Lord Rees at an earlier point he agreed with the notion that the starting list—I would emphasise that this was a starting list so that the Oxburgh Panel could become familiar with those areas of CRU's work which had been most subject to criticism. Lord Rees indicated that that would be a very good starting point. So I sent that list on 4 March anticipating that the Royal Society would approve it because Lord Oxburgh wanted to move very quickly with his assessment. That list went out to the panel members on 10 March anticipating that that would be the list which the Royal Society approved and, indeed, they did approve it on 12 March. A confirmation went out on 15 March, and it was a slightly modified list to my memory, but I don't have a complete recollection of that. I can certainly let you have this in writing after today.²

Q81 Graham Stringer: I have just one final question on that. The response was not fulsome, was it, to that request? It said: "I am not aware of all the papers that could be included in the list, but I do think that these papers do cover the issues of major concern." That's hardly—

Professor Trevor Davies: The Climatic Research Unit has published in excess of 1,000 peer review publications.

Q82 Graham Stringer: And the criticism from Montford is that in actual fact a lot of the papers that the controversy is about—the multi-proxy papers—are not included in these 11 papers. What I am really saying is—

Professor Trevor Davies: Can I respond to that, please?

Graham Stringer: Yes.

Professor Trevor Davies: I would dispute that. Of course Mr Montford has publicly acknowledged that he was not a non-partisan author. There certainly has been some blog comment about the most criticised papers not being in that list. In fact there has been very little comment about precisely which papers should have been included. One of the few comments has been in Mr Montford's report and he mentioned three publications in particular: Jones et al of 1998; Mann and Jones, 2003, and Osborn and Briffa 2000. That list seems to have been taken from a longer list on Mr McIntyre's blog site of 15 April after the Oxburgh Report came out. In fact, the majority of the publications listed by Mr McIntyre on 15 April were referenced in the CRU's submission to Muir Russell, which the Oxburgh Panel received, or some were on the Oxburgh starting list.

Mr. McIntyre made a submission to the predecessor Committee, which he copied to Muir Russell and the

² Note by witness: The list of publications sent to the Oxburgh Panel on 15 March included the original 11 publications plus four supporting items on the list sent to the Royal Society on 4 March, with 2 additional supporting items.

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CRU papers which he specifically referred to in that submission were: Briffa 2000—that was on the Oxburgh Panel starting point list; Briffa et al 2001—that was on the Oxburgh Panel starting list; Melvin and Briffa 2008. That in fact was a wrong reference. That should have been Briffa and Melvin. It is still not published but there was a pre-print available. The Oxburgh Panel saw that paper. Mr McIntyre also mentioned Briffa et al 1992. That was not on the starting list. This was a paper on the Torneträsk tree-ring series. This was covered in Briffa 2000, which was on the starting point list, and it was referred to in the Muir Russell submission. The only other paper which McIntyre mentioned was Briffa et al 1995. That also was not on the starting point list. This was a paper on Polar Urals tree rings. This was covered in Briffa 2000, which was on the starting list, and was also referred to in the Muir Russell submission.

Q83 Graham Stringer: That was a very complete answer, Professor Davies. You had obviously thought about it before. Do you still think that after all of these inquiries that you still agree with your original comment that the CRU had no case to answer?

Professor Trevor Davies: It had a case to answer but not in terms of the science. I think it had a case to answer in terms of being more proactive in the way that it responded to requests for various pieces of information. Not all data, of course. Many of those requests were for e-mails, but in terms of the science, then, I don't believe that it does have a case to answer. It has a case to answer, as many other climate scientists do—indeed, as all scientists in other areas do—of doing rather more to make particularly previous versions of data series, previous to publication, available for scrutiny.

Q84 Graham Stringer: Thank you. Sir Muir, on page 92 of your report you say, and I paraphrase, that there is no attempt to delete e-mails after there had been a request made, whereas in actual fact the e-mail of 27 May from Jones actually asked for deletion of e-mails, didn't it?

Sir Muir Russell: It requested them. I think we said that there was incitement to delete. You have quoted half the sentence. The first bit says: "There seemed clear incitement to delete but we had seen no evidence of any attempt to delete in respect of a request already made."

That is quite a tricky area because they do still exist, apart from anything else, but the question that I think you're getting at is whether we sought to chase that particular question about deletion of requested e-mails through our review.

Q85 Graham Stringer: I suppose we are haggling about the word "attempt", aren't we?

Sir Muir Russell: Yes.

Graham Stringer: That's the real issue.

Sir Muir Russell: I don't want to play with semantics because the real challenge that is in behind here is that the Russell Review—we will call it that—didn't come to a conclusion on deliberate deletion of e-mails that had been requested. The reason we didn't do that was something that I think I made clear to Mr Boswell

when this came up in question 171 in March. I said I wasn't going to put the review into the position of making the sort of quasi-judicial prosecutorial, investigative judgments that Mr Thomas—you will remember he spoke at the beginning of that session—had spoken about. That was an ICO's job. That was the position that we took. So, had we been going to get into this, we would have had to start asking questions under caution. We would have been doing the sort of investigative stuff, because you're getting to the point where you're alleging that there might have been an offence, and that really wasn't the thing that my inquiry was set up to do, especially when there is a parallel entity called ICO that has the investigative skills, the training and the background with its personnel.

So that, in short order, was why we didn't go down the road of saying, "And did you delete things that had been requested?", because we felt that that would take us into an area where we would have had to operate under caution, and it wasn't actually relevant to where we had got to on the issue that all this is about, which is what was the end product of the influence that this process had on what was said in the IPCC report. We can talk about that at some length. But what I said to Mr Williams about going after the big issues is really referable to the fact that we moved in that direction rather than chasing the words in the individual e-mails.

Q86 Graham Stringer: I find it a bit surprising, that you didn't ask directly when a lot of the controversy had been about the request to delete e-mails. You didn't personally ask Professor Jones—it was the 29th, not the 27th; I apologise for that—directly whether he had deleted those emails?

Sir Muir Russell: That would have been saying, "Did you commit a crime?", and we would have had to go into a completely different area of the relationship and formal role for the inquiry. Remember, what this chain of logic is all about is a process that is leading up to what did or didn't get admitted as evidence in an IPCC chapter. That's the issue that matters.

Q87 Graham Stringer: Well, I think it does matter.

Sir Muir Russell: It is not that it is immaterial. We had lots to say about FOI and Professor Acton can say quite a bit about what the university has done about that.

Q88 Graham Stringer: I am going to ask Professor Acton.

Sir Muir Russell: Yes. I'm sure you will because that was one of the points I was distinguishing very clearly between the honesty and rigour as regards the science and the way in which people handle the FOI and other procedural things. On this one, given what I have just said about what I said to Mr Tim Boswell and about the relationship with ICO, we felt that the most sensible thing to do was to move through this issue to look at the question of what was actually being said in the IPCC report and whether the Wahl and Amman material should be in or not, and what the overall judgment about that was. So if we ducked or avoided, I plead guilty to that, but I think we had quite good

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reasons in terms of our inquiry for not asking that particular question.

Q89 Graham Stringer: When you came to this Committee in March, were you aware that you weren't going to ask Professor Jones or anybody else whether they deleted e-mails?

Sir Muir Russell: In the terms in which it related to the thing that might have been alleged to be a criminal offence, I have referred you. It is question 171 of the proceedings, which I have brought with me, because I knew from reading the Mr Holland material that this is one of the chains of the logic that he brings out.

Q90 Graham Stringer: That's right. He put a Freedom of Information request in on the 27th.

Sir Muir Russell: Yes.

Q91 Graham Stringer: So there is the e-mail from Jones on the 29th requesting deletion. So it's quite a fundamental part.

Sir Muir Russell: Yes, but it is covered in the 7 July statement by ICO, and it was covered in your exchanges with the Vice Chancellor. It does take you into the area of interviewing under caution and so on, but that is the judgment we made. It's a fact. We didn't ask these questions.

Q92 Graham Stringer: No. You have been very clear, honest and straightforward about that. You didn't ask the questions. So what I am asking you now is, were you aware of that when you came before the Committee in March?

Sir Muir Russell: That's what I said to Mr. Boswell. Yes.

Q93 Graham Stringer: Yes. I don't recall you telling us that.

Sir Muir Russell: We can play with words, but that is what 171 was about, in my understanding.

Q94 Graham Stringer: Right. I shall look at that. Professor Acton, are you satisfied that these questions weren't asked, that people in your university were sending out e-mails suggesting that e-mails should be deleted and that hasn't been investigated?

Professor Edward Acton: It has been investigated. I have asked them and they have assured me that they have never knowingly deleted e-mails subject to a request.

Q95 Graham Stringer: Did you ask them under caution?

Professor Edward Acton: The relationship that I have with them is rather different. It is absolutely part of my duty to address that kind of spirit and make sure I drive it out of the university and establish the facts. Can those e-mails be produced? Yes, they can. Did those who might have deleted them say they deleted them? No. They say they did not. I wanted to be absolutely sure of those two, and I have established that to my satisfaction.

Q96 Graham Stringer: And you recorded those meetings with Professor Jones and his team?

Professor Edward Acton: If you examine our website you will find that these statements have been there for some time.³

Q97 Graham Stringer: Did you ask Professor Briffa why he thought it necessary to take e-mails home?

Professor Edward Acton: I didn't. I can, if it is appropriate, tell you an element that I think may bear upon it, which was that at the time he was gravely ill and rather frequently not in the university. So to take a copy home does not seem to me very extraordinary, but I haven't asked him.

Q98 Graham Stringer: You haven't. Did you, Sir Muir?

Sir Muir Russell: No.

Q99 Graham Stringer: So you don't think there was any question about security of the e-mails? It was entirely about the health of Professor Briffa?

Professor Edward Acton: I've told you that it seems to me, in speculating on why he might have done that, that does seem an extraordinarily plausible explanation. My concern is to be sure that they are produced and producible, that they are there and that both colleagues firmly assert that they did not do what is in question.

Q100 Graham Stringer: Are all those e-mails now available and can they be read?

Professor Edward Acton: Yes.

Q101 Graham Stringer: And you agree with that, Sir Muir?

Sir Muir Russell: Yes. As I understand it, they are part of the 3,000 pages.

Q102 Chair: The Information Commissioner wrote to us very recently and said in his letter: "We were generally impressed by the processes in place and actions taken to improve the culture related to FOI and EIR." So you are accepting, Professor Acton, that there were weaknesses in your systems?

Professor Edward Acton: Yes, I am—I think in our systems and in clearly pockets of our culture. I am very keen to ensure that UEA is an exemplar in this. I take the matter very seriously. I've written to all members of staff. I went with the registrar and visited the ICO, which was a remarkable experience in Wilmslow.

Q103 Chair: But, in essence, you are saying that that weakness with freedom of information practices had no bearing on the quality of the science?

Professor Edward Acton: Yes, I am. But of course, I still mind very much even though the two are now severed, because there are other areas, in medicine and in a lot of social science, where again issues of freedom of information can be highly sensitive and controversial and I want my university to be whiter than white on it.

³ Note by witness: Please replace "our website" with "your website". Professor Acton was referring to the submission made to the Committee on 2 September [Ev 20].

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Q104 Pamela Nash: This question is to Sir Muir. In your review you found no evidence to support that there was any subversion of the peer review process and you examined three specific instances. Could you tell us why those three instances were chosen?

Sir Muir Russell: They were the three that had been at the top of the head, as it were, in the comments that were made when the whole story broke. I keep going back to what I said to Mr Williams. They were the things which we thought, as we were looking at the issues, were solid and good examples to pick and to test the accusations that had been made. I know there are comments that say, "You could have found more. There could have been others." They weren't in the forefront at the time. If you look at the footnote in Montford, I think it is, about one of them, it says that it wasn't actually clear what the allegation was, so one has to be balanced. We couldn't do everything but we looked at three very solid accusations. The Soon and Baliunas was one that came up all the time and we looked at that fairly thoroughly. The editor of *Energy and Environment* had sent a lot of emails to me about what we would do. So it was important to check out that position. Then there was the Cook stuff and there is quite an extensive explanation of what was actually going on there. I think you will find three quite detailed explanations based on information that we got about what was actually happening.

Then, of course, we did the important thing of getting Richard Horton to work on peer review for us. You will see from the record of the predecessor Committee that one of the things that had happened that was, let's say, uncomfortable, because I was quite uncomfortable sitting here when being asked about it, was that Dr Campbell of *Nature* had to leave the group because he had been interviewed and had said there was nothing wrong with what CRU had done. That was a prejudicial thing about the inquiry. It had nothing to do with his views about climate science. It was prejudicial about the inquiry, and he very properly said, "I have to leave."

So we brought in Richard Horton, not as a full member in the sense of being on the team and looking at all the work that we had done, because it would have been very difficult to catch up on that, but we brought him in to give us advice on peer review. We peer reviewed that because we got Liz Wager of COPE to have a look at that as well. You will see all that in the report.

So I think that setting that set of judgments against the facts of the cases as we found them was really quite a good and balanced way of getting a serious big picture about what these people had been doing in relation to peer review and also peer review more generally so there are specific answers and there are some general points to go forward with on peer review. I put my hand up and say, yes, there could well have been other cases that we might have looked at, but these were the ones that everybody seemed to think were at the top of their heads at the time.

Q105 Pamela Nash: Do you feel that there was a general culture within CRU of pre-judging publications for peer review just because they supported certain views on climate change?

Sir Muir Russell: I am not and have never been a practising scientist, but I do take the Horton wise words quite seriously that people get committed to their views and they get committed to the work that they have done and sometimes the judgments that they have made. It doesn't surprise me in the least if people should say, "I don't agree with that." It doesn't surprise me in the least that in a context in which there is a lot of challenge—and the one thing you would be bound to say, looking at all the papers you have in front of you and the various reports and representations that there have been, is that there is a lot of challenge—I think it is entirely natural that people should take a robust view about their own work. The one thing that Horton really told us was that it's entirely natural. So that, in a sense, set a kind of calibration for us of how we would judge what, on any analysis, are robust and, I will use the word, sometimes quite aggressive bits of phraseology about why they didn't agree with particular things. But these were genuine areas of debate, and the whole Horton message is, "Let the debate go and see where we get to."

Q106 Stephen Mosley: Can we move on to the confidentiality of the peer review process now? I know that in your reports you do assess whether or not there is a breach of confidentiality with regard to the IPCC's Fourth Assessment Report, but that does specifically relate to the IPCC processes. There are the wider issues of confidentiality in the peer review process in general. Did your review team investigate the possibilities that the Climatic Research Unit's staff may have breached the confidentiality of the peer review process in general?

Sir Muir Russell: Is this the Briffa-Cook-Stahle piece in chapter 8 that you are referring to, Mr Mosley?

Q107 Stephen Mosley: No, I am moving on more to e-mails like the 26 February 2004 e-mail when Phil Jones e-mailed Michael Mann about a paper that it appears he had been shown by his CRU colleague, Tim Osborn. If you read the e-mail it gives the impression that Professor Jones does feel that the request he is making might be contrary to some of the rules. If you read it, it does say things like, "Can I ask you something in confidence?", "Don't e-mail this around", "He wants to be squeaky clean", "Forget this e-mail when you reply". It does imply that when the e-mail was sent there was a belief that this might not be completely in line with accepted practice.

Sir Muir Russell: If that's the one that was introduced by Mr Montford in the middle of his report, it wasn't one that was really given much attention at the time, to be honest with you. With regard to the tentative comments from Mr Montford, "It appears to be a breach", "It appears likely", you could equally read that e-mail and say that there was a question put to Jones rather than showing him the paper. We didn't dig into that one at the time. I acknowledge that we didn't. I challenge the proposition that we were recommended to do it by anything that was said in the Horton paper. There is a statement from Mr Montford that we ignored the advice of our expert and didn't follow up on this, but I don't think that is actually

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right. So I will readily admit that that was not one that we chased down. I don't think it bears quite the interpretation that has been placed on it and the comments on it. If it was one that we didn't look at then I'm sorry about that, but I don't think it's a high point of the problems that were alleged to be around in this case at the time when we were working through it.

Q108 Stephen Mosley: Moving to the other two members of the panel here, do you think that the behaviour of the CRU scientists when discussing papers for peer review with other colleagues is common practice within scientific research?

Professor Trevor Davies: I am sorry. Would you mind repeating that?

Q109 Stephen Mosley: Would that sort of thing, where CRU scientists were discussing papers for peer review with other colleagues, be common practice within scientific review?

Professor Trevor Davies: It is. I think all reviewers are well aware of the important issues of confidentiality, as Sir Muir has indicated. There will be a number of occasions, and I think this is accepted within the peer review community, where an individual reviewer is not expert in all areas which are covered by a particular publication. Certainly conversations will go on with colleagues in confidence, without revealing any details of data or results, about advice, about whether this, for example, is an appropriate methodology. I think that is within the spirit of peer review and doesn't break the conventions of peer review and confidentiality.

Q110 Chair: I note, Professor Acton, that you said you are a historian; you're not a scientist. I am sure if Phil Jones were here he would argue that he is a scientist, and not a lawyer. Did you ever ask him what he meant by, "So forget this e-mail when you reply"? **Professor Edward Acton:** No, I haven't asked him that.

Q111 Chair: It is a bit of a sloppy phrase that leads one to imply that he was trying to hide something?

Professor Edward Acton: I suppose the historian bit of me says that I would like to know the full correspondence around it before leaping to conclusions which don't, even in this room, seem to be the same, but I don't think I'm awfully well qualified to take it very far.

Q112 Stephen Metcalfe: Can we move on to the allegation of scientific fraud that was made against Professor Jones, specifically in relation to the 1990 paper? Sir Muir, did you fully investigate the issues surrounding the allegation of fraud?

Sir Muir Russell: I think that is covered in chapter 6, if I remember correctly, on the use of local temperature data from china.

Q113 Stephen Metcalfe: So it was fully looked at; okay. Given that Professor Jones acknowledged in his interview with *Nature* that the stations probably did move, did you question him directly about that?

Sir Muir Russell: Yes. As far as I recall, we did. I am not just sure whether we picked that one up in one of the interviews or not, but we had plenty of information about it. We had Mr Peizer's evidence, we had Mr Keenan's assertions, and we had the full record of the story which we set out here, which is that this, if I remember rightly, arose 17 years after the initial paper was written and was really rooted in an allegation about Wang, the New York, Albany, scientist. The position is that Jones said, "Let's wait and see what happens about that." In the meantime there was a Jones paper being written which was trying to ask the same question and check whether that was valid or not. So our conclusions, really, as we set it out, were that it didn't look as though this was a problem about the science. Actually, we did just a little bit of work on the code to run it without China in it, and it doesn't make any difference to those graphs.

So, for a variety of reasons, what in another world they used to call "triangulation", we came to the view that this was not a problem about CRUTEM, about the scientific record and about the conclusions that might be drawn from it. That is without prejudice to Professor Jones' comment that he, maybe, could have handled it better and he wishes it had been different. The guy was under the most immense pressure, as you can imagine, then. These are the things he said, and it is probably quite valid.

As far as asking the question, what difference does this make to the big picture that people are going to be taking and using, I think our feeling was that it didn't.

Q114 Stephen Metcalfe: So it didn't affect the big picture but there was an acceptance that, perhaps, it could have been done differently? In fact it was a sloppy use of information.

Sir Muir Russell: And not being able to turn up the records, which may have been a New York problem. The fact of the matter is that they couldn't be turned up at the time, and one understands that.

Q115 Stephen Metcalfe: Obviously it is a serious allegation that there was a scientific fraud. Just taking that slightly wider, who do you believe should be responsible for looking at scientific frauds and investigating allegations of that sort?

Sir Muir Russell: It is difficult. I'm not sure it was fraud. Fraud implies that it was all deliberately set out to be done to conceal or to fabricate. I don't think that's the evidence of what people thought they were doing in 1990. Whether it should have taken 17 years for someone to spot it and whether, at the end of the day, the records weren't right so that you could set it right is another question. But, remember, Jones did another paper—I can't remember just who it was with but it is referenced here, "Jones, Lister and Li, Q"—to check the thing through.

Who should investigate fraud? Well, we've talked a bit about the peer review process. That doesn't, as Horton says, tell you that something is right or wrong. It gives you some signals about it but not totally. We've talked about how data should be made available so that people can check, can replicate and can actually do what in most scientific fields is done.

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You have a look at what somebody did, and you say, “Can I do that? Is it right? Is it really possible that they could have done this?” Then when you do it, you discover that, actually, there is something else that maybe was a better explanation or a different mechanism or whatever and so a new piece of science emerges. So, in a sense, to make sure that there is enough out there for people to be able to go through that process, that seems to me to be the best way that I would think that we, the citizenry, should guard against fraud. That’s why there is quite a bit in this report about data and about space in which people can feel safe and comfortable in sharing that data. That’s why there are bits about how it’s handled, recorded and made available so you are sure that we don’t lose it.

So there is a whole bundle of issues. I don’t think there is a single audit body that you would say is always going to be looking at fraud and taking a random sample of people’s papers and re-doing their science in the way that you do with public finances or whatever. I don’t think it would work that way.

Q116 Stephen Metcalfe: But when that sort of issue crops up and it is discovered that perhaps there is a different way of interpreting the data or a different way of looking at it and that perhaps it is not as robust as it was first presented, how do you ensure that then a correction or an amendment to the original document is published or produced so that you can then read it in the new context? Slightly widening that, how does the UEA ensure that that happens across just your university? What processes do you have in place?

Professor Trevor Davies: With particular reference to the Keenan allegation, Mr Keenan didn’t make a submission to the Muir Russell Review and he didn’t contact Lord Oxburgh either. However, he did contact the State University of New York and made a fraud allegation against Professor Wang. This was before he published a paper in a journal which is edited by the director of the Global Warming Policy Foundation. This was the title: “The Fraud Allegation Against Some Climatic Research Of Wei-Chyung Wang.” The State University of New York, where Professor Wang was a member of staff, investigated these allegations thoroughly and Professor Wang was entirely exonerated. So the allegation has been investigated. Mr Keenan seems to have shifted the same allegation over to Phil Jones. They are the same allegations which the State University of New York at Albany determined were groundless.

The two publications in question were subject to assessment by Lord Oxburgh and they saw nothing wrong at all. It is perfectly true, although Mr Keenan did not do any data analysis whatsoever in this article in the journal, that he did make some claims about the stations having moved location. Phil Jones acknowledged that the 1990 paper could be improved as a result of this further knowledge. He had no access to the knowledge at the time and, as Sir Muir has indicated, did in fact confirm the results of the 1990 paper in a later paper in 2008. This was, I believe, at the same time that Mr Keenan published his allegations in the journal edited by the director of the

Global Warming Policy Foundation, but I would need to check that.⁴

The results were confirmed. This is in the nature of science. As new and better data come along, as more knowledge is developed, new techniques, the conclusions are refined. If a clarification were issued to every single scientific publication which ever came out, as methods improve, as more knowledge becomes available, as more data become available, then the publishing of science would grind to a halt.

Q117 Stephen Metcalfe: So it is not possible is what you are saying?

Professor Trevor Davies: What I am saying is that the allegations of fraud were investigated thoroughly.

Q118 Stephen Metcalfe: Put that aside. If then it is discovered that the basis upon which a report was originally written has changed and there is new information, new methods and new techniques, can you still have faith in that document or do you have to say, “That no longer can stand”? How do we know? How does one know that things have changed enough that that is no longer a valid conclusion?

Professor Trevor Davies: Because in the later publication, Jones et al 2008, there were clear references to the 1990 paper. There was a clear account of which data were common to the 1990 paper and the 2008 paper. There was confirmation of the main thrust of the results in the 1990 paper, and this was almost 20 years ago. So the way in which that further information was introduced into the scientific literature was by this later paper in 2008.

Q119 Stephen Metcalfe: I have just one final point, Chair. I accept that, but that is where an additional paper had been written on this particular subject, and that was able to build upon the work of the previous report. What I am saying is, when that hasn’t taken place, when a report exists but new information has come to light, how do you then put that into the public domain to put it in context?

Professor Trevor Davies: I am sorry. I misunderstood the thrust of your question. In those particular circumstances then, yes, a correction can be made to the original paper.

Q120 Stephen Metcalfe: My question was, how do you ensure that happens?

Professor Trevor Davies: Professor Jones said he would give that some thought; it’s worthy of consideration. He did give it some thought. He considered it. He talked with others and the consensus view was that the publication in the 2008 paper addressed any possible questions around the 1990 paper.

Sir Muir Russell: Can I come back on that one? I think you are probably making quite an important general point—that there is a paper sitting there in the literature and somebody thinks it’s not quite right. Do you put a footnote on that old paper that says, “Take note, folks”?

Stephen Metcalfe: That’s exactly what I am saying.

⁴ Note by witness: Mr Keenan’s article was published in 2007, not 2008.

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Sir Muir Russell: When you go to the library and take this down from the shelf, or the electronic shelf, it's not the last word on the subject.

I don't know the answer to that. As I said before, I'm not a practising scientist, but I see people going to conferences, writing conference papers and other things in journals, and anybody who knows the subject keeps up with the literature and, basically, says, "At that conference, Professor X challenged what Professor Y said", and will not let it rest. Professor X has got his or her reputation to make and will want that to be heard. It will be in the literature in the broadest sense. Anybody who is searching it to get the up-to-date picture—this is one of the powers of this internet world that we all sometimes worry about—cannot actually miss it. It is not a physical library where if you didn't have that journal in that series you wouldn't know that the thing was there. It is actually much better now. So what I would rely on is indexing, checking and the work of the electronic media. Is that right?

Professor Trevor Davies: Yes.

Q121 Stephen Mosley: Sir Muir, in your report you looked at the particular allegation that during the preparation of the IPCC's Fourth Assessment Report Professor Briffa inappropriately used an unpublished paper by Wahl and Amman in an attempt to rebut a critique by McIntyre and McKittrick of the hockey stick graph. In your report, you state that your team did not find "any direct evidence to support the allegation that members of the Climatic Research Unit misused their position on IPCC to seek to prevent the publication of opposing ideas". I note that you qualify the word "evidence" with "direct". Does this mean that there was some indirect or circumstantial evidence?

Sir Muir Russell: I think the discussion that we had with Mr Stringer attempts to demonstrate a chain of consequence that if things were happening that were, arguably, not quite right here then you need to infer that there was something being concealed there which was leading to something there, and so on. That really is the essence of at least that stream of argument. What we were trying to do was to say, so what was the end product? The end product was that there was a piece of science that everybody knew about which was current but may or may not have met what were original deadlines, and there is a whole process about whether those deadlines changed. But the essence of what we did was to go to the review editor and say, "What's your take on whether it was or wasn't reasonable to bring this in?" You can see that Mitchell comes back and says, "It would be silly not to take in something and leave your report two years out of date." So it's at that point that we say this looks like the right thing to do and it looks like something that Briffa would not, on his own, have influenced—any more than in relation to the urbanisation effect, where Jones's position is in the Hoskins evidence. So we are trying to get to the big issue end point.

In the midst of all of this, there is a long and consequential chain of argument about dates and times, rules and processes. Some of it is in our report. Quite a bit of it is in Mr Holland's evidence that he

has submitted. You have seen some of it and you've accessed some of the websites and so on. We are really just saying, be all that as it may, that the end point seems to us to be a sensible place, and the end point is not a point that Briffa, as was alleged, could have done on his own privately and for any particular personal or malign reasons.

Q122 Stephen Mosley: You mentioned Mr Holland there. There has been criticism, and I know we have received complaints as well, of your decision not to publish David Holland's submission detailing the alleged breaches of the IPCC's rules. Did you take Mr Holland's evidence into account before you made the judgment on the allegation of the breaches of the IPCC's rules?

Sir Muir Russell: Yes, and you will see that Mr Holland's recent comments do acknowledge that in fact Briffa and colleagues saw his submission and commented on it. So we have quite extensive paperwork, and I think it is reproduced in the evidence on the website, that shows Mr Holland's submission being taken very carefully into account in responses and, I can assure you, being very fully discussed by us before we produced the material that is in the second half of chapter 9. The only issue, I think, turns on whether the full submission was appropriate to publish, given some elements of the terms in which it was written. But I think the substance of the issues has all been dealt with. The team went into that pretty carefully.

Q123 Stephen Mosley: The IPCC asked the InterAcademy Council to give an independent review of the IPCC processes. Did UEA have any involvement with that review? When the results were announced on 30 August, have you subsequently looked at those recommendations and have you taken any action because of them?

Professor Trevor Davies: We were certainly not consulted as a university. It is possible that some of our colleagues were consulted individually. I can't give you the answer to that today but we can certainly send in those details.⁵ Yes, of course, we've noted the recommendations. These are recommendations for the IPCC, for the United Nations. I don't really think that it's our position to comment on them here.

Q124 Stephen Mosley: Moving slightly wider, what changes have you actually introduced then at CRU to restore confidence in its scientists, their publications and the way in which they interact with the wider academic community?

Professor Edward Acton: In terms of restoring confidence, the critical thing is to have review after review after review to establish that they have found no shred of evidence that should shake confidence in their science. In terms of their integration, we have drawn them rather closer into the rest of the School of Environmental Sciences to ensure that all processes are run as they should be, notably FOI ones, that, were there any kind of repeat of that, they are dealt with absolutely as they should be and that there are none

⁵ See Ev 35

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of the errors either of commission or omission that may have happened in the past.

On the front of statistics, we are encouraging that they draw more closely on some of our professional statisticians and we may well also be investing in further posts in that area. Trevor, I don't know what you would add?

Professor Trevor Davies: We are also investing in posts to help CRU ensure that its data archive is efficient—that all of the previous versions of data series are in a readily accessible form so that when requests do come through for data series or for meta data as supporting data they will be more readily accessible and available than they have been hitherto.

Q125 Chair: Gentlemen, thank you very much. Just before we formally close, can I give you the opportunity to conclude your remarks with anything you think we need to know about that we haven't yet covered, either this morning or during our previous inquiry?

Professor Edward Acton: I would like to thank the work of the Committee. I would like to endorse the Government's response to you where it welcomes the Committee's support for CRU and the scientific reputation of Professor Phil Jones, where it notes in the conclusion of the scientific appraisal that CRU has done a "public service of great value" in its work. I share the Government's pleasure to note the exceptionally strong contribution that UK scientists,

including those at CRU, have played in assessing climate changes, understanding current and future impacts and proposing solutions to mitigate and adapt those changes.

As our representatives looking after this field of human knowledge, I'm delighted at the time and trouble you have taken in March and again here to underscore the conclusions the Government sets out there.

Q126 Chair: Sir Muir?

Sir Muir Russell: I got my chance at the beginning when I was responding to Mr Williams to talk a bit about the big issues that went beyond CRU's big issues. I think, looking at the whole context of peer review, looking at how data are handled, there is quite a bit of discussion now involving the UUK and ICO about that and that American experience, and looking at the way in which science does communicate. We said some rather grandiloquent things about safe spaces and all of that, but these are the sorts of things, looking forward, that I would hope the Committee might find would cross its path at some time in the future, either directly or indirectly, to encourage science to keep thinking about where it is going and how it operates in the modern, unmoderated but policy-aware world that we all live in. So this was a chance for us, as a team, to get a few things off our chests. Thank you for giving us the chance to do that.

Chair: Thank you for your attendance.

Written evidence

Memorandum submitted by the University of East Anglia (UEA Reviews 00)

CLIMATIC RESEARCH UNIT AT UEA

I understand that the Committee will shortly be holding evidence sessions on the work of the two reviews set up by UEA following the illegal hacking of emails from our Climatic Research Unit (CRU). I welcome the opportunity to provide Members with an update on developments since I attended the Committee's evidence session on 1 March and since the two independent Reviews reported.

UNIVERSITY SECTOR ISSUES

We welcome the reflections on public policy put forward in the reports published by Sir Muir Russell and Lord Oxburgh. Particularly timely are those bearing on public engagement with science and on the need for early dialogue between the Information Commissioner's Office and the Higher Education sector over the application of Freedom of Information principles to university research (my further comments and those of the President of UUK are attached in appendices A1 and A2). My focus here, however, is on more detailed matters relating to the reviews and subsequent steps taken by the University.

SCIENCE ASSESSMENT

The Oxburgh Review, conducted by an international panel of scientists, was asked to consider whether "the conclusions represented an honest and scientifically justified interpretation of the data" or, as the Select Committee's own Report put it in March, "whether the work of CRU has been soundly built." The Panel was unequivocal. It found absolutely no evidence of dishonesty or scientific malpractice. It praised the Unit for carrying out work of great public value. On scientific methodology, the Panel judged CRU's approach fair and satisfactory but it urged closer collaboration with expert statisticians, a recommendation the University is now acting upon.

The Muir Russell Review was conducted by a panel that included scientific expertise but extended well beyond it. It invited submissions from anyone anywhere in the world and then examined in meticulous detail the allegations that had been made against CRU's scientists. It concluded that their "rigour and honesty as scientists are not in doubt" and found not a shred of evidence to cast any doubt on the extent to which the work of CRU's scientists can "be trusted and should be relied upon."

It has been asserted that neither Muir Russell nor Lord Oxburgh's reviews looked into the quality of the science itself (see the *New Scientist* editorial, 17 July 2010). UEA's response to these assertions—which sometimes betray a failure to understand the scientific process—is provided in the University's response to the *New Scientist* editorial, as published on the UEA website and attached at appendix B.

Concerns that UEA had changed the brief of Lord Oxburgh's review were expressed in the media, notably on the *Today* programme on 7 July. This is not the case. Lord Oxburgh writes in the first paragraph of his published report that his brief, agreed with UEA, was to determine whether "data had been dishonestly selected, manipulated and/or presented to arrive at pre-determined conclusions that were not compatible with a fair interpretation of the original data." This was the essence of the criticism against CRU, and clearly addressed the scientific conclusions of CRU's research. This was confirmed in the second paragraph of Lord Oxburgh's report where he writes that he was asked to determine whether "the conclusions represented an honest and *scientifically justified* (our italics) interpretation of the data". Lord Oxburgh and UEA have together issued a statement refuting an accusation that that UEA asked Lord Oxburgh to adopt a narrower brief than that described in his report. This was sent to the BBC and posted on the UEA website on 11 July 2010 and is attached as appendix C. The BBC has offered no evidence to support its assertion and we await their response to our request for a correction.

We were pleased to note that the findings of the two Reviews were further reinforced by the recently published "Denial by the Environmental Protection Agency of the Petitions to Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases" as summarised in appendix D. The full document is available at the following web address:
<http://www.epa.gov/climatechange/endangerment/petitions/decision.html#I-A>

As members may be aware, the US Environmental Protection Agency determined in December 2009 that climate change caused by emissions of greenhouse gases threatens the public's health and the environment. Since then the EPA received petitions challenging this determination, claiming that climate science cannot be trusted. After a lengthy investigation of the CRU emails and of the state of climate change science generally, EPA found no evidence to support the claims that the CRU emails and documents undermined the scientific evidence for climate change. The University welcomes this further independent validation of the importance and integrity of CRU's work and the conclusions of the two UK independent reviews.

DISCLOSURE OF DATA

In terms of the conclusions of the Muir Russell report, the University has accepted the Review's criticisms of its handling of requests for disclosure of data and other material. The University's formal response to the Muir Russell Review provides further information on how we intend to implement the recommendations of the Review (appendix E).

We have established that the potential email deletion which gave rise to the ICO's concern did not take place, and the University has received undertakings from the CRU staff most notably involved in the emails that they will fully comply with the letter and spirit of Freedom of Information requests. Extracts from statements they have made on this subject are provided in appendix F.

SHARING DATA

The University has acknowledged the need for openness in dealing with requests for data. One way in which we are working to provide new methods of providing open access to research data is through a new collaborative project funded by the Joint Information Systems Committee and conducted in partnership by UEA and the Science and Technology Facilities Council. The project will examine how best to make climate data easily available for all those interested to use and scrutinise. Further information on the project is provided in appendix G.

Finally, may I draw Members' attention to the recently-published book *Merchants of Doubt* by Oreskes and Conway (appendix H). I share the view expressed by many commentators that it represents an important contribution to our understanding of the changing nature of the public debate about climate change.

I hope that this information will assist the Committee. I would be happy to provide any further details required.

Professor Edward Acton
Vice-Chancellor, University of East Anglia

2 September 2010

APPENDIX A1

WHERE NEXT FOR FREEDOM OF INFORMATION?

Tue, 31 Aug 2010

An opinion piece from Prof Edward Acton, Vice-Chancellor, University of East Anglia

The core purpose of the Freedom of Information Act is profoundly progressive: to tighten collective control over power. Public access to an organization's thinking is a strong antidote to corruption, deception and repression. Without it, there is no reason to think MPs' expenses would have been brought under control. The Soviet regime could not have lived with it at all.

Where university research is concerned, the FOIA forms an important part of the healthy drive for increased openness. Research Councils and other funders now routinely require that the data and methodology needed to validate research findings be made public.

The requirement may absorb time and resource, but is well worth it. The more fully it is embraced, the more surely new findings can be subjected to the sceptical scrutiny on which the progress of academic research depends. And the lower the risk that certainty will be overplayed or probability underplayed.

But there are dilemmas. If data gathered by researchers is to be disclosable before they have completed work on it, issues of commercial and intellectual property become acute. Take the recent ruling by the Information Commissioner (made under the FOIA's twin, the Environmental Information Regulation) to force Queen's University Belfast to hand over painstakingly assembled Irish Tree Ring data. Are we to find that commercial companies (located anywhere in the world—our FOIA is wonderfully cosmopolitan) may secure the release of the unworked data of every UK university?

What about records of conversations among researchers, their unfinished questioning, musing and thinking aloud? Should they be available to anyone on demand? The notion that private reflection has no place in a body subject to the Information Commissioner has shades of Orwell's 1984.

Following this month's Muir Russell Review of "Climategate", which dissected the allegations made against scientists at UEA's Climatic Research Unit (CRU) and concluded emphatically that "their rigour and honesty is not in doubt", the President of Universities UK, Steve Smith condemned the subjection of researchers to intimidation and threats:

"Attempts to create controversy and discredit researchers in some fields serves only to erode public trust in our researchers and risks setting back progress in many key areas."

Smith remarks that if Einstein had been subjected to such challenges when his research was in the formative stage, his reputation would have been terminally damaged before he got to the theory of relativity. Or take Darwin. Almost two decades elapsed between his voyage on *HMS Beagle* (1840) and publication of *On the Origin of Species* (1859). Had he been forced to release his momentous musings before he was ready, he might well have been stopped in his tracks like other pioneers of evolutionary theory.

As e-mail becomes a daily substitute for verbal exchange, it is intensifying the dilemma. Where research is concerned, e-mails recreate the best and worst aspects of coffee-room chats: they are a source of countless intellectual breakthroughs but characterised, as psychologists point out, by a style that is often stark, uninhibited and easily misunderstood especially out of context.

The UK could learn from the US. There the FOI distinguishes between recorded factual material necessary to validate research findings, which must be disclosed, and “preliminary analyses, drafts of scientific papers, plans for future research, peer reviews [and] communications with colleagues”, which are exempted.

Until the line is soundly drawn and widely understood, there will be unfortunate side-effects. Any refusal or reluctance to disclose is easily read, especially by those in the grip of a conspiracy theory, as sinister. As one commentator on the CRU affair pointed out: “Like Desdemona’s handkerchief, Climategate offered absolute proof to those maddened by paranoia, but to the rest of us it remained just a handkerchief.”

Smear tactics may matter little in this instance, given that the remorseless upward trend of global temperatures is so carefully verified internationally, and that it seems to become grimly clearer month by month. But it is easy to think of more virulent belief-systems feeding upon the refusal of an FOI request, however legitimate the grounds for refusal.

The dilemma over deliberation and consultation extends beyond research. There is a direct public interest in preserving the ability to have candid, rapid, multi-person e-mail discussions to quickly formulate thinking. The risk that all such e-mails might be forcibly disclosed could have the same chilling effect on debate as requiring offices and telephones to be bugged and the tapes released on demand. Because of FOI concerns, civil servants are apparently reluctant to use e-mail for controversial internal debate and blue-skies thinking.

If fear of eavesdropping drives consultation underground, rather as the KGB’s listening devices drove Soviet citizens to discuss weighty matters in the kitchen with the tap running, the cost is likely to be high. We will be at a disadvantage as a country in terms of full and frank deliberation, and historians will deeply regret the impoverishment of the archives.

But these are early days. The Information Commissioner will no doubt seek balance and clarity. The next step is to take the Act further and extend its remit over concentrations of power as yet minimally subject to collective control. We might start with the press, the commercial giants . . . and the banks.

APPENDIX A2

UNIVERSITIES UK RESPONSE TO SIR MUIR RUSSELL’S CLIMATE CHANGE E-MAILS REVIEW

Universities UK has responded to the publication of Sir Muir Russell’s Independent Climate Change E-mails Review. The Review was established in December 2009 after emails from the University of East Anglia’s Climatic Research Unit were hacked and published online.

Professor Steve Smith, President of Universities UK and Vice-Chancellor of the University of Exeter, said: “Universities UK is pleased with the review’s finding that the rigour and honesty of scientists at the University of East Anglia’s Climatic Research Unit are not in doubt.

“Sir Muir Russell has conducted a thorough and objective review into events last year. It is entirely appropriate that these allegations were investigated thoroughly by an independent process that was fair to all concerned.

“There are lessons here for the university sector as a whole, particularly in relation to openness and Freedom of Information. Researchers and research organisations are always developing and improving how research is carried out and published. We agree that it is vital that researches are self-critical and think about the wider aspects and implications of their work, particularly in controversial areas such as this.

“The principle of academic freedom is central to the work of higher education institutions. Researchers must have freedom within the law to put forward new ideas and controversial or unpopular opinions without the fear of intimidation and threats.

“Attempts to create controversy and discredit researchers in some fields serves only to erode public trust in our researchers and risks setting back progress in many key areas. If Einstein had been subjected to such challenges when his research was in the formative stage, his reputation would have been terminally damaged before he got to the theory of relativity.

“We cannot have a situation where researchers, dealing with controversial areas of study, are faced with a barrage of requests for information on early drafts of research and discussions, with the sole aim of disrupting that work. While the principles of the Freedom of Information Act (FoIA) are supported by all universities, and the vast majority of Freedom of Information requests are handled efficiently and effectively, there remain some critical questions about the application of the Act, and Environmental Information Regulations, to research data and correspondence. As the report points out, there is a clear need for clarification from the Information Commissioners’ Office about the treatment of material relating to

research, and how best to respond to orchestrated campaigns and harassment. Universities UK will be meeting with representatives of the Information Commissioner's Office in the next few weeks to discuss this and other issues.

“Research integrity is vital and there must be public trust in the work conducted at our universities. The UK leads the world in terms of the quality of its university research so the integrity of this work is crucial and must be safeguarded.

“Recognising this, Universities UK worked with other organisations some years ago to set up the UK Research Integrity Office (UKRIO) to provide independent and expert advice to researchers, employers and the public on good practice in research and addressing misconduct.”

APPENDIX B

RESPONSE TO NEW SCIENTIST EDITORIAL (17 JULY 2010)

27 Jul 2010

It is depressing that the *New Scientist* follows parts of the blogosphere, and some other sections of the press, in asserting that of the three independent investigations into Climategate “none looked into the quality of the science itself” (Editorial, 17 July 2010, page 3). Our hope was that *New Scientist* would have a more informed understanding of the method of science research.

Lord Oxburgh writes, in the first paragraph of his report, that his panel was asked to address criticism “that climate data had been dishonestly selected, manipulated and/or presented to arrive at pre-determined conclusions that were not compatible with a fair interpretation of the original data”. In the second paragraph he wrote “The Panel was not concerned with the questions of whether the conclusions of the published research were *correct . . . rather . . . whether as far as could be determined the conclusions represented an honest and scientifically justified interpretation of the data*” (our italics).

The Oxburgh Panel operated, and wrote their report, entirely independently and so we cannot answer for the precise form of words used, but it does seem entirely consistent with the way science works. *New Scientist*, when do science conclusions become “correct”? Science conclusions remain provisional, becoming more or less provisional over time, until/unless they are replaced by scientifically likelier conclusions, or unless they reach the elevated status of “fact”. In the observational sciences, that process develops through the honestly and scientifically justified interpretation of data.

The compilation of a hemispheric or global land surface data time series from irregularly distributed (in time and space) historical thermometer observations can never be “correct” in an absolute sense. There will always be uncertainty, as there will be greater relative uncertainty in our knowledge of past temperatures from “proxy indicators” such as tree-rings. The discovery, or utilisation, of more or better proxy records might improve our understanding of the Mediaeval Warm Period. Developing analytical techniques may also change our understanding; hence the provisionality of scientific conclusions.

When one understands how science research progresses it is clear that the Oxburgh approach is entirely consistent with—as his report says—an investigation into whether CRU’s research conclusions were scientifically justified. Moreover, as many others have pointed out, there is a similarity with the conclusions on the character of climate change from many other groups around the world using a variety of variables and indicators.

Although the main focus of the Muir Russell Review was not the science, as the report made clear, a reading of the document clearly shows that a number of the questions put to CRU did address science. Examples include “Does not the problem of divergence for the late 20th century record invalidate the deduction of tree ring palaeotemperatures for the period prior to the instrumental record?”, and “How has this choice (*of data stations worldwide*) been tested as appropriate in generating a global or hemispheric mean temperature (both instrumental and proxy data)?” Certainly the answers provided to these, and other, questions were couched in scientific terms.

We would urge readers of *New Scientist*, and others, to read the Oxburgh and Muir Russell reports as well as CRU’s submissions to Muir Russell to judge for themselves the adequacy or inadequacy of the examinations of CRU science. They may also like to bear in mind that CRU’s research has been published in the top peer-reviewed international journals (unlike almost all of the criticism). Although peer review—as Muir Russell pointed out—is not perfect, the *New Scientist*, more than many other printed media, will understand the significance of this point.

A proper reading of this material will also demonstrate that CRU did not regard its “assembly of 160 years of global thermometer data” as “private property”, as *New Scientist* claims. Muir Russell concluded “On the allegation of withholding temperature data, we find that CRU was not in a position to withhold access to such data or tamper with it”. Some data were subject to non-publication agreements but the vast majority were already freely available; ready for anyone (as Muir Russell demonstrated) to reconstruct temperature time series virtually identical to those of CRU (and others).

The “judgemental decisions” about which Oxburgh made comment, and to the *New Scientist* refers, were not about thermometer data, as the Editorial implies, but related to tree-ring data. Oxburgh and Muir Russell both emphasised that, within CRU’s scientific publications, the uncertainties around tree-ring temperature reconstructions were fully explained.

The stolen emails demanded serious independent investigation. We instigated two ourselves and, in response to a letter to the Chair of the Parliamentary Science and Technology Committee, our Vice-Chancellor made clear his enthusiasm for cooperating with a Parliamentary Inquiry, should that be the decision. Although we have suggested that *New Scientist* readers do examine the Oxburgh and Muir Russell reports, and our submissions to Muir Russell, we recognise that many will not and will depend, at least in part, on the Editorial comment to form their opinion. We fear that the Editorial’s imprecision will help to perpetuate the distortion to debate produced by the controversy of Climategate, much of which was contrived.

Not all was contrived. We agree that open-ness in sharing data, “even with . . . critics”, is a legal requirement. Largely, we have met that requirement although we have accepted that, in some instances, we should have been more helpful, pro-actively and absolutely. A particular instance to which Muir Russell brought attention was meta-data, not observational data, but still data which were pertinent to an interpretation, by others, of some of CRU’s analyses. We are addressing this.

It would have been helpful if the *New Scientist* had drawn a distinction between the disclosure of data (including meta-data) and analysis methods, and the disclosure of email conversations, including those which were clearly regarded as confidential communications by sender and recipients. Others are recognising that there are important differences, and there are implications for the way that research is conducted in the UK. It is important that we do have candid conversations about these matters, and we think that the *New Scientist* is in a good position to help in the understanding of these implications.

APPENDIX C

UNIVERSITY OF EAST ANGLIA DID NOT CHANGE THE BRIEF OF THE OXBURGH PANEL

11 Jul 2010

Following a broadcast on the *Today Programme* on BBC Radio 4 on 7 July 2010, and text on Roger Harrabin’s blogsite on the BBC webpages, the following has been sent to Mr Harrabin by Lord Oxburgh and Professor Trevor Davies.

“The University asked the Panel chaired by Lord Oxburgh to consider whether “data had been dishonestly selected, manipulated and/or presented to arrive at pre-determined conclusions that were not compatible with a fair interpretation of the original data”. It is not true that Professor Davies subsequently asked Lord Oxburgh, as you claim, to adopt a “narrower . . . brief” of any kind. We shall be grateful if you would correct the wrong impression which has been given”.

APPENDIX D

6560.50

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Chapter 1

[EPA-HQ-OAR-2009-0171; FRL 9184-8]

EPA’s Denial of the Petitions to Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act

Agency: Environmental Protection Agency (EPA)

Action: Notice, Denial of Petitions to Reconsider

Summary: The Environmental Protection Agency (EPA) is denying the petitions to reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act. The Findings were signed by the Administrator on 7 December 2009. EPA has carefully reviewed all of the petitions and revisited both the scientific record and the Administrator’s decision process underlying the Findings in light of these petitions. EPA’s analysis of the petitions reveals that the petitioners have provided inadequate and generally unscientific arguments and evidence that the underlying science supporting the Findings is flawed, misinterpreted or inappropriately applied by EPA. The petitioners’ arguments fail to meet the criteria for reconsideration under the Clean Air Act. The science supporting the Administrator’s finding that elevated concentrations of greenhouse gases in the atmosphere may reasonably be anticipated to endanger the public health and welfare of current and future U.S. generations is robust, voluminous, and compelling, and has been strongly affirmed by the recent science assessment of the U.S. National Academy of Sciences.

Dates: This denial is effective 29 July 2010.

Addresses: EPA's docket for this action is Docket ID No EPA-HQ-OAR-2009-0171: All documents in the docket are listed on the www.regulations.gov website. Although listed in the index, some information is not publicly available, eg, confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through www.regulations.gov or in hard copy at EPA's Docket Center, Public Reading Room, EPA West Building, Room 3334, 1301 Constitution Avenue, NW., Washington, DC 20004. This Docket Facility is open from 8.30 am to 4.30 pm, Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air Docket is (202) 566-1742.

Supplementary Information:

Acronyms and Abbreviations. The following acronyms and abbreviations are used in this Decision.

ACUS	Administrative Conference of the United States
ANPR	Advance Notice of Proposed Rulemaking
APA	Administrative Procedure Act
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CAIT	Climate Analysis Indicators Tool
CBI	confidential business information
CCSP	Climate Change Science Program
CFR	Code of Federal Regulations
CH ₄	methane
CO ₂	carbon dioxide
CRU	Climatic Research Unit
DOT	U.S. Department of Transportation
EISA	Energy Independence and Security Act
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
FOIA	Freedom of Information Act
FR	Federal Register
GHG	Greenhouse gas
HadCRUT	Climatic Research Unit (CRU) temperature record
ICTA	International Center For Technology Assessment
IPCC	Intergovernmental Panel on Climate Change
MWP	Medieval Warm Period
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NHTSA	National Highway Traffic Safety Administration
NOAA	National Oceanic and Atmospheric Administration
NO _x	nitrogen oxide
NRC	National Research Council
NSPS	new source performance standards
PM	particulate matter
PSD	Prevention of Significant Deterioration
TSD	technical support document
U.S.	United States
UNFCCC	United Nations Framework Convention on Climate Change
USGCRP	U.S. Global Change Research Program
WMO	World Meteorological Organization

I. INTRODUCTION

A. *Summary*

This is EPA's response denying the petitions to reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act ("Findings" or the "Endangerment Finding") (74 FR 66496, 15 December 2009). EPA has considered all 10 petitions, including the arguments presented therein and the supplemental information provided by the petitioners as supporting evidence of their claims. EPA has evaluated the merit of the petitioners' arguments in the context of the entire body of scientific and other evidence before the Agency. This response (hereafter "Denial" or "Decision") provides EPA's scientific and legal justification for denying these petitions. This Denial is accompanied by a 3-volume, roughly 360-page Response to Petitions (RTP) document (<http://www.epa.gov/climatechange/endangerment.html>), containing further responses and technical detail concerning every significant claim and assertion made by the petitioners. Section III of this Decision summarizes many of the responses provided in the RTP document.

After a comprehensive, careful review and analysis of the petitions, EPA has determined that the petitioners' arguments and evidence are inadequate, generally unscientific, and do not show that the underlying science supporting the Endangerment Finding is flawed, misinterpreted by EPA, or inappropriately applied by EPA. The science supporting the Administrator's finding that elevated concentrations of greenhouse gases in the atmosphere may reasonably be anticipated to endanger the public health and welfare of current and future U.S. generations is robust, voluminous, and compelling. The most recent science assessment by the U.S. National Academy of Sciences strongly affirms this view. In addition, the approach and procedures used by EPA to evaluate the underlying science demonstrate that the Findings remain robust and appropriate.

Petitioners generally argue that recent revelations show that the science supporting EPA's Endangerment Finding was flawed or questionable, and that EPA should therefore reconsider the Endangerment Finding. The petitioners' arguments and claims are based largely on disclosed private communications among various scientists, a limited number of errors and claimed errors in the 2007 Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4),¹ and submissions of a limited number of additional studies not previously considered as part of the scientific record of the Endangerment Finding.

As discussed in detail throughout this Decision and in fuller detail in the RTP document, petitioners' claims and the information they submit do not change or undermine our understanding of how anthropogenic emissions of greenhouse gases cause climate change and how human-induced climate change generates risks and impacts to public health and welfare. This understanding has been decades in the making and has become more clear over time with the accumulation of evidence. The information provided by petitioners does not change any of the scientific conclusions that underlie the Administrator's Findings, nor do the petitions lower the degrees of confidence associated with each of these major scientific conclusions.

More specifically, the petitions do not change EPA's proper characterization of the current body of knowledge and our ability to state with confidence our conclusions in the following key areas of greenhouse gas and climate change science: (1) that anthropogenic emissions of greenhouse gases are causing atmospheric levels of greenhouse gases in our atmosphere to rise to essentially unprecedented levels in human history; (2) that the accumulation of greenhouse gases in our atmosphere is exerting a warming effect on the global climate; (3) that there are multiple lines of evidence, including increasing average global surface temperatures, rising ocean temperatures and sea levels, and shrinking Arctic ice, all showing that climate change is occurring, and that the observed rate of climate change stands out as significant compared to recent historical rates of climate change; (4) that there is compelling evidence that anthropogenic emissions of greenhouse gases are the primary driver of recent observed increases in average global temperature; (5) that atmospheric levels of greenhouse gases are expected to continue to rise for the foreseeable future; and (6) that risks and impacts to public health and welfare are expected to grow as climate change continues, and that climate change over this century is expected to be greater compared to observed climate change over the past century.

The core defect in petitioners' arguments is that these arguments are not based on consideration of the body of scientific evidence. Petitioners fail to address the breadth and depth of the scientific evidence and instead rely on an assumption of inaccuracy in the science that they extend even to the body of science that is not directly addressed by information they provide or by arguments they make. This assumption of error is based on various statements and views expressed in some of the e-mail communications between scientists at the Climatic Research Unit (CRU) of the University of East Anglia in the United Kingdom and several other scientists ("the CRU e-mails").² As EPA's review and analysis shows, the petitioners routinely take these private e-mail communications out of context and assert they are "smoking gun" evidence of wrongdoing and scientific manipulation of data. EPA's careful examination of the e-mails and their context shows that the petitioners' claims are exaggerated, are often contradicted by other evidence, and are not a material or reliable basis to question the validity and credibility of the body of science underlying the Administrator's Endangerment Finding or the Administrator's decision process articulated in the Findings themselves. Petitioners' assumptions and subjective assertions regarding what the e-mails purport to show about the state of climate change science are clearly inadequate pieces of evidence to challenge the voluminous and well documented body of science that is the technical foundation of the Administrator's Endangerment Finding.

Inquiries from the UK House of Commons, Science and Technology Committee, the University of East Anglia, Oxburgh Panel, the Pennsylvania State University, and the University of East Anglia, Russell Panel,³ all entirely independent from EPA, have examined the issues and many of the same allegations brought forward by the petitioners as a result of the disclosure of the private CRU e-mails. These inquiries are now complete. Their conclusions are in line with EPA's review and analysis of these same CRU e-mails. The inquiries have found no evidence of scientific misconduct or intentional data manipulation on the part of the climate researchers associated with the CRU e-mails. The recommendation for more transparent procedures concerning availability of underlying data appears appropriate, but it has not cast doubt on the underlying body of science developed by these researchers. These inquiries lend further credence to EPA's conclusion that petitioners' claims that the CRU e-mails show the underlying science cannot or should not be trusted are exaggerated and unsupported.

Petitioners' also point to a limited number of factual mistakes in IPCC AR4, some confirmed, some alleged, to argue that the climate science supporting the Administrator's Endangerment Finding is flawed. EPA's review confirmed two factual mistakes. These two confirmed instances of factual mistakes are tangential and minor and do not change the key IPCC AR4 conclusions that are central to the Administrator's Endangerment Finding. While it is unfortunate that IPCC's review process did not catch these errors, in the context of a report of this size and scope (almost 3,000 pages), it is an inappropriate and unfounded exaggeration to claim that these two confirmed mistakes delegitimize all of the scientific statements and findings contained in IPCC AR4. To the contrary, given the scrutiny to which IPCC AR4 has been subjected, the limited nature of these mistakes demonstrates that the IPCC review procedures have been highly effective and very robust.

In a limited number of cases, the petitioners identify new scientific studies and data, published since the Endangerment Finding was finalized, which they claim require EPA to reconsider the Endangerment Finding. Some petitioners also argue that EPA ignored or misinterpreted scientific data that were significant and available when the Finding was made. EPA's review of these claims shows that in many cases the issues raised by the petitioners are not new, but were in fact considered prior to issuing the Endangerment Finding. In other cases, the petitioners have misinterpreted or misrepresented the meaning and significance of recent scientific literature, findings, and data. Finally, there are instances in which the petitioners have failed to acknowledge other new studies in making their arguments. The RTP document contains study-by-study analysis of these failed arguments on the part of petitioners.

Finally, in May 2010, the National Research Council (NRC) of the U.S. National Academy of Sciences published its comprehensive assessment, "Advancing the Science of Climate Change"⁴ (NRC, 2010). It concluded that "climate change is occurring, is caused largely by human activities, and poses significant risks for—and in many cases is already affecting—a broad range of human and natural systems." Furthermore, the NRC stated that this conclusion is based on findings that are "consistent with the conclusions of recent assessments by the U.S. Global Change Research Program, the Intergovernmental Panel on Climate Change's Fourth Assessment Report, and other assessments of the state of scientific knowledge on climate change." These are the same assessments that served as the primary scientific references underlying the Administrator's Endangerment Finding. Importantly, this recent NRC assessment represents another independent and critical inquiry of the state of climate change science, separate and apart from the previous IPCC and U.S. Global Change Research Program (USGCRP) assessments. The NRC assessment is a clear affirmation that the scientific underpinnings of the Administrator's Endangerment Finding are robust, credible, and appropriately characterized by EPA.

The endangerment to public health and welfare from atmospheric concentrations of greenhouse gases and associated climate change is too important an issue to be decided on any grounds other than a close and comprehensive scrutiny of the entire body of the scientific evidence. This principle calls for an outright rejection of the petitioners' arguments. The petitioners' arguments amount to a request that EPA ignore the deep body of science that has been built up over several decades and the direction it points in, and to do so based not on a careful and comprehensive analysis of the science, but instead on what amount to assertions and leaps in logic, unsupported by a rigorous examination of the science itself. The petitioners do not provide any substantial support for the argument that the Endangerment Finding should be revised. Therefore, none of the petitioners' objections are of central relevance to the considerations that led to the final Endangerment Finding. In addition, in many cases these arguments by the petitioners either were or could have been raised during the comment period on the Endangerment Finding. In summary, EPA's thorough review of petitioners' arguments shows that the petitioners have not met the criteria for reconsideration under section 307(d) the Clean Air Act (CAA).⁵

REFERENCES

¹ IPCC (2007). Fourth Assessment Report: Climate Change 2007. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

² All of the disclosed CRU e-mails at issue in this Decision can be found in full in EPA's docket for the Endangerment Finding. See Docket ID No EPA-HQ-OAR-2009-0171, "CRU E-mails 1996-2009."

³ These inquiries plus another addressing IPCC AR4 issues are referred to throughout this Decision and the RTP document. Every inquiry is provided in full in EPA's docket for the Endangerment Finding. See Docket ID No EPA-HQ-OAR-2009-0171, "Recent Inquiries and Investigations of the CRU E-mails and the IPCC Fourth Assessment Report."

⁴ National Research Council (NRC) (2010). *Advancing the Science of Climate Change*. National Academy Press. Washington, DC.

⁵ Some petitioners also raise objections to EPA's Endangerment Finding based on legal arguments related to other EPA or National Highway Traffic Safety Administration actions. For the reasons discussed in Section IV of this Decision, those objections also fail to meet the standard for reconsideration and are denied.

APPENDIX E

THE INDEPENDENT CLIMATE CHANGE E-MAILS REVIEW—JULY 2010

UNIVERSITY OF EAST ANGLIA'S RESPONSE

1. The University is indebted to Sir Muir Russell and his team for conducting a comprehensive, thoughtful and challenging Review into the allegations which have been made against the University's Climatic Research Unit (CRU) following the publication of a large number of emails and other material, which are believed to have been obtained illegally from a back-up server in CRU.

2. The Review was conducted over a period of seven months and looked for evidence of manipulation or suppression of data by scientists in CRU or of manipulation of the peer review process, and addressed issues relating to compliance with the Freedom of Information Act (FoIA) and the Environmental Information Regulations (EIR) for the release of data and correspondence, and the governance and security structures for CRU.

3. The University welcomes Sir Muir's approach to the Review, which invited any party, evidently including those who had levelled allegations through the media and the "blogosphere", to make representations to it. The team was painstaking in its analysis and transparent in making all evidence it received, and the records of interviews conducted available on its website, other than where that would be defamatory or otherwise unlawful.

4. The University welcomes the findings that:

"On the specific allegations made against the behaviour of CRU scientists, we find that their rigour and honesty as scientists are not in doubt"

"We do not find that their behaviour has prejudiced the balance of advice given to policy makers. In particular, we did not find any evidence of behaviour that might undermine the conclusions of the IPCC assessments."

5. These findings reflect those of other reviews and inquiries conducted both prior to and subsequent to the publication of the Review.

5.1 The Commons Science and Technology Committee (in March 2010), following its inquiry, stated that: "Within our limited inquiry and the evidence we took, the scientific reputation of Professor Jones in CRU remains intact".

<http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/387/387i.pdf>

5.2 Lord Oxburgh's Scientific Assessment Panel reporting in April 2010 similarly found that: "We saw no evidence of any deliberate scientific malpractice in any of the work of the Climatic Research Unit and had it been there we believe that it is likely that we would have detected it".

<http://www.uea.ac.uk/mac/comm/media/press/CRUstatements/SAP>.

5.3 More recently the US Environmental Protection Agency (EPA) published its "Notice of Denial of the Petitions to Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases". The EPA conducted a comprehensive review of a number of issues including the allegations which had arisen as a consequence of the publication of the emails and other material. The Denial of the Petitions and the accompanying volumes are a substantial body of evidence and careful analysis. The summary (Section A) of the Denial states *inter alia* "Petitioners . . . rely on an assumption of inaccuracy in the science . . . based on various statements and views expressed in some of the e-mail communications between scientists at the Climatic Research Unit (CRU) of the University of East Anglia . . . and several other scientists. . . EPA's careful examination of the e-mails . . . shows that the petitioners' claims are exaggerated, are often contradicted by other evidence, and are not a material or reliable basis to question the validity and credibility of the body of science . . . Inquiries from the UK House of Commons, Science and Technology Committee, the University of East Anglia, Oxburgh Panel, the Pennsylvania State University, and the University of East Anglia, Russell Panel, . . . have examined the issues and many of the same allegations brought forward by the petitioners . . . These inquiries are now complete. Their conclusions are in line with EPA's review and analysis of these same CRU e-mails. The inquiries have found no evidence of scientific misconduct or intentional data manipulation on the part of the climate researchers associated with the CRU e-mails . . . These inquiries lend further credence to EPA's conclusion that

petitioners' claims that the CRU e-mails show the underlying science cannot or should not be trusted are exaggerated and unsupported".

<http://www.epa.gov/climatechange/endangerment/petitions/decision.html#I-A>

6. The Review expresses a number of concerns and raises broader issues, but is critical of the University and CRU in aspects of its adherence to the spirit and intent of the FoIA or EIR. The University accepts the criticisms levelled by the Review and values the many recommendations of the report for improvements in the processes for dealing with FoIA and EIR requests and will seek to implement them fully. The University accepts that an apparent reluctance to provide access to data gave the impression that CRU was attempting to hide issues relating to its science. Clearly the conclusions of the Review are that there was nothing to hide, which underscores the point that the interests of CRU, the University and the dissemination of its research would have been best served by a more proactively helpful response to requests for information relating to data used for CRU's published analyses.

7. The University is collaborating in two significant activities arising from the issues raised in paragraph 6 above. Firstly, while the University is already undertaking a number of steps to improve engagement with FoIA/EIR, a senior team led by the Vice-Chancellor will be meeting with the Information Commissioner and his colleagues to review the University's processes and to seek guidance as to additional improvements which may be necessary. Secondly, CRU, in partnership with the Science and Technology Facilities Council E-Science Centre is embarking on a Joint Information Systems Committee funded project. This will examine how best to provide standardised access to processed climate data, linked both to raw observations and meaningful descriptions of intermediate processing.

<http://www.jisc.ac.uk/news/stories/2010/07/data.aspx>

8. In the following paragraphs we paraphrase and summarise the key, more detailed, findings and recommendations of the Review and, where appropriate, add a comment in italics. References to the Review are shown as (page, paragraph).

SCIENTIFIC INTEGRITY

9. The Review's further comments on the robustness and transparency of the research of CRU are welcome.

Land Station Temperatures

9.1 CRU was not in a position to deny anybody access to temperature data. The team demonstrated that anyone could download station data, directly from primary sources, and construct a temperature trend analysis that agreed very well with that produced by CRU. *This was an invaluable and instructive contribution to refuting allegations made against CRU that data was withheld as a barrier to challenge. (53,6.7)*

9.2 The Review team demonstrated that its analysis of the temperature trend remained largely consistent regardless of stations selected and the use of adjusted or unadjusted data. *CRU had not manipulated its selection of station data or its analysis to achieve a pre-determined outcome to show a rise in global temperatures. (53, 6.7)*

Temperature Reconstruction from Tree Ring Analysis

9.3 There was no evidence that past temperature data as derived from tree ring proxies was misleading, nor was there evidence in IPCC AR4 of the exclusion of other temperature reconstructions that would show a different picture. The extent of the uncertainties surrounding such past temperature reconstructions were extensively covered in AR4, including the divergence of tree ring proxies from instrumental records in more recent times. (59, 21)

9.4 CRU did not withhold underlying raw data, having directed the single request for information to the owners of that data. (61, 29)

Peer Review and Editorial Policy

9.5 There was no direct evidence of subversion of the peer review or editorial process. (68,18)

Misuse of the IPCC process

9.6 Allegations that in two specific cases there had been a misuse by CRU of the IPCC process, in presenting AR4 to the public and policy makers, could not be substantiated. CRU researchers were part of a large group of scientists taking responsibility for the AR4 text, and were not in a position to determine the content. (13, 26)

DISCLOSURE OF DATA AND CORRESPONDENCE

10. The Review is critical of the handling of requests for disclosure of data and other material, and also makes a number of recommendations to the University.

Land Station Temperatures

10.1 CRU should have made available an unambiguous list of the stations used in the construction of its land temperature record at the time of publication. *We accept that the University was slow in providing this data when requested. (51, 32)*

Temperature Reconstruction from Tree Ring Analysis

- 10.2 The figure of trends in land temperatures supplied for the WMO report, whilst not misleading per se in splicing past temperature reconstructions and modern day temperature records, did not clearly describe the mechanisms used in the construction of the figure in the caption. *The University would comment that the figure was an illustration for the cover of the report and additional explanation was supplied on the inside cover and in the text. (13, 23)*
- 10.3 There was a delay in archiving tree ring data by its owners. *The University will, as part of a wider protocol documenting the agreements over the use of data provided by others, promote the benefits of such data being archived and accessible. In some instances, however, this will not be achievable, particularly where the commercial interests of the owners come into play. (62, 38)*

FoIA/EIR

- 10.4 While the University had widely distributed initial guidance on the introduction of the FoIA/EIR regimes, there was evident confusion within CRU as to how these should be applied, for example, to data, codes and personal correspondence. There was insufficient priority given to motivating staff and continuing their education in this respect. Senior staff need to make clear their commitment to transparency and to resourcing the process. *The University accepts that all staff from the top down must be better engaged with the FoIA/EIR regimes. The University has already begun a programme of further training with awareness raising for senior staff. The Vice-Chancellor has written to all staff to underline UEA's commitment to this. All new staff will receive a written statement concerning responsibilities under the FoIA/EIR together with annual updates. All staff with a particular role in the implementation of FoIA/EIR (recognising the general obligation of all colleagues) will attend annual workshops to update their knowledge. A programme specifically for staff closely involved with EIR will be mounted. The resources available to the FoIA team have been increased. (91, 25 and 91, 33)*
- 10.5 There was a failure to recognise the extent to which more careful engagement with requesters would have been both appropriate and helpful to avoid fuelling the fire of suspicion. *We fully accept this criticism and our various steps referred to in this response seek to address it. (91, 26)*
- 10.6 There was a tendency to give unhelpful responses: failing to address the question asked or giving partial answers. There was extensive delay in providing details of those station identifiers which were not the subject of confidentiality agreements. *Again, we accept the University could have performed much better in responding to these requests and steps are being taken to address this. (91, 27)*
- 10.7 A number of emails appeared to incite deletion or evidence deletion of other emails, although there was no evidence of emails being deleted that were the subject of a request for disclosure. *We accept this shows insufficient awareness of and focus on obligations under the FoIA/EIR, but we welcome the finding that there was no attempt to delete information with respect to a request already made. This confirms assurances already given to the Vice-Chancellor by colleagues in CRU that they had not deleted material which was the subject of a request. We have underlined that such action would have been one of the key elements necessary to constitute an offence under Section 77 of the FoIA and Section 19 of the EIR, the others being that information had actually been deleted, that it was deleted with the intention to avoid disclosure and that it was disclosable and not exempt information. Professor Jones has commented that, while emails are cleared out from time to time, this is to keep accounts manageable and within the allocated storage. (92, 28)*
- 10.8 There is an imbalance of authority between the Information Policy and Compliance Manager (IPCM) and senior academic staff holding information which may be the subject of a request for disclosure. There is also a lack of constructive challenge in the appeals processes. *The University has amended its protocols to allow the Director of Information Services and the Registrar to become involved at an early stage in the consideration of sensitive cases and for reviews of any decisions not to disclose information then to be undertaken by others at a senior level in the University. These changes are being formalised in a revised code of practice. (93, 29 and 93, 30)*
- 10.9 There is a lack of understanding of the presence of long-duration back-ups of email which, had it been stronger, would have led to a greater challenge of assertions regarding the availability of material. *We accept this, albeit, as is recognised in the Information Commissioner's guidance, retrieving such data may not always be a practical option. (93, 31)*
- 10.10 There was a fundamental lack of engagement by the CRU team with their obligations under FoIA/EIR. *CRU is now more clearly integrated within the management and administrative structures of the School of Environmental Sciences, and the Head of School will take greater responsibility for compliance with FOIA/EIR requirements. The University also has undertakings from the Director of Research (Professor Jones) of necessary improvements in this regard in the future. (93, 32)*

BROADER ISSUES

11. The Review identifies a number of broader issues which are a valuable commentary on the process of scientific debate, both generally and in the particular instance of climate science:

- 11.1 Much of the challenge to CRU's work has not followed the conventional method of checking and seeking to falsify conclusions or offering alternative hypothesis for peer review and publication. *Again, the Review has been invaluable in demonstrating that the great bulk of the temperature data used by CRU was already readily available and that there was no barrier to checking or seeking to offer alternative hypotheses compatible with the data. Attempts simply to taint the science with the content of email exchanges are not the appropriate way to probe or challenge the conclusions (15, 35 and 15, 36)*
- 11.2 The scientific community must learn to communicate its work in ways that recognise the emergence of the blogosphere and non-traditional scientific dialogue. That this provides an opportunity for unmoderated comment, for challenge without inhibition and for highly personalised critiques of individuals and their work to be promulgated without hindrance is a point well taken. *The University accepts this is a necessary but challenging task. (14, 31 and 15, 33)*
- 11.3 The research community must establish very clearly the requirements of funders for the release of data and its archiving, and the associated costs. *We agree, noting that these requirements should be proportionate to the likely wider value and importance of the data. (104, 36)*
- 11.4 It is important for policy makers and lobbyists to understand the limits on what science can say and with what degree of confidence. Alternative viewpoints should be recognised in policy presentations, with a robust assessment of their validity, but challenges should always be rooted in science rather than in rhetoric. *The University fully endorses this observation. Challenges to science should come through peer review publication substantiating the alternative; not through criticism of emails which, as the Review states, are rarely definitive evidence of what actually occurred. (14, 32)*
- 11.5 While Peer Review is an essential part of the process of judging scientific work, it is not a guarantee of the validity of the individual pieces of research, and the significance of challenge to individual publication decisions should not be exaggerated. *We agree with the Review that robust challenges to the publication of research which experts believe, in good faith, does not meet the standards required is commonplace and should not be dismissed as an attempt to "silence" critics. (15, 33)*

SECTOR WIDE ISSUES

12. The Review raises a number of issues which require a sector-wide debate, and engagement between the representative bodies and the ICO. The University strongly supports this approach and will seek to promote further consideration of these important issues through Universities UK, the Joint Information Systems Committee (JISC) and other bodies.

- 12.1 Raw data, meta-data and codes necessary to allow independent replication of results should be provided concurrent with peer reviewed publication. However, so far as preliminary analyses, drafts of scientific papers, plans for future research, peer reviews and communications with colleagues are concerned, the American approach, where these are exempt from disclosure, is one which is worthy of consideration. *(94, 34)*
- 12.2 CRU was the subject of an orchestrated campaign of FoIA/EIR requests, and while more positive engagement by CRU would have mitigated this, conceivably there are situations where such campaigns could recur and overwhelm any small research unit. The ICO is urged to provide guidance on how best to respond to such campaigns. *(95, 34)*
- 12.3 The ICO could produce further guidance as to how long it is reasonable to retain data without releasing it, pending full publication as part of a peer reviewed paper. *We agree that this is an important concern. The many benefits of publication are set out elsewhere in this response. Nonetheless data sets, carefully assembled, may result in a number of publications for an individual, the very foundation on which a scientific reputation is built. For how long is it reasonable for an individual to have their intellectual investment protected? (95, 34)*
- 12.4 There should be a standardised way of defining station data and meta-data, and for publishing a snapshot of the data used for each important publication. *We will discuss with the WMO but this will not be a trivial undertaking. (53, 40)*
- 12.5 The storage of important research data, and the associated meta-data which make that data useful, should be specified by those funding research and there should be a clear statement as to which data should be placed in the public domain and any constraints on the timing of its release. *(104, 36)*

GOVERNANCE

13. The Review makes a number of recommendations to the University on risk management and on the storage and security of data.

- 13.1 The University was insufficiently alert to the implications of the external attitudes which existed towards the work of CRU and of the attention of external pressure groups, and mitigation

- measures should be put in place. Greater CRU security, a bias for openness and a properly resourced policy on data management and availability should have resulted. *The University will undertake a Faculty-based risk assessment of all areas of the University's research; implement more centralised IT support to ensure appropriate security levels; and develop processes which ensure that senior management are informed of emerging problems in a timely fashion. The University will participate (with others) in projects to improve the storage of and access to research data both specifically in respect of climate data and more generally.* (103, 33)
- 13.2 Universities should develop formal approaches to the training of researchers in basic software development methodologies and best practice. *We shall consider the development of a programme of workshops for researchers in appropriate disciplines.* (103, 34)
- 13.3 There should be a formal approach to storage and archiving of meta-data where a university is hosting a unit of such international significance as CRU. *We agree and have successfully bid for grant funding to support a project for our three principal data sets. It is anticipated that the results of this project will provide an exemplar for climate researchers, including those outside UEA.* (103, 35)
- 13.4 At the point of publication of research, enough information should be available for others to reconstruct the process of analysis, including the source code. *The University accepts this should be the case, unless valuable intellectual property or other commercial constraints are in play.* (104, 37)
- 13.5 Where the University establishes a framework and standards in areas such as information systems but allows local interpretation, this should be subject to robust audit. *The University is centralising the control of IT systems and intends to reduce the level of discretion of research groups and others for the control and management of IT. Adherence to overall policies will be part of the future programme of internal audit.* (104, 38)

UPDATING

14. The University will update this document as the steps set out in the body of the document are progressed.

APPENDIX F

EXTRACTS FROM STATEMENTS BY PHIL JONES AND KEITH BRIFFA CONCERNING EMAIL DELETION

PHIL JONES

“As I have said on a number of occasions I do delete emails from time to time—this is usually as part of a regular clear out but sometimes as I go along”.

“Most people seem to do the same to keep their email account manageable and because we are regularly reminded when storage space on our email system is nearly full”.

“There is also an environmental and economic cost to storing emails so it seems to me that it is not good practice just to keep everything”

“It would be very difficult to guess what might be asked for in future so I don't go around deleting emails just because they might be asked for at some point.”

“I have previously confirmed that I have never knowingly deleted an email that was the subject of an active Freedom of Information request and neither have I deleted data”.

KEITH BRIFFA

“For my part I wish to assure you that I have not knowingly deleted emails or files that were at the time subject to a request under FOIA or EIR, and will not do so in the future”.

“I also assure you that I will not suggest to anyone that they should delete emails or files subject to similar requests under FOIA or EIR”.

“I will use whatever means at my disposal to encourage greater openness and proactive compliance with FOIA and EIR within the CRU and the wider University.”

APPENDIX G

CLIMATE DATA TO BE OPENED UP

28 Jul 2010

Climate scientists at the University of East Anglia will soon be demonstrating new methods of providing open access to research data—thanks to a major new investment from JISC to improve the way UK university researchers manage their data.

Dr Simon Hodson, programme manager at JISC, said: “Climate scientists have been under the spotlight recently: there have been technical and cultural challenges to making data and methods openly available, and a perception of failure to do so has been taken by critics of mainstream climate science as an indication of unsound science.

“Clearly, confidence in research findings—among scientists and the general public—depends upon the underpinning data and methods being open, reusable and verifiable. What is more, researchers aren’t just producers of data; they are also consumers, so by funding projects which will improve practice and will give climate scientists and others better guidance on research data management JISC aims to help them make that data more usable and valuable,” he added.

Three independent reviews focused on hacked emails from climate scientists at UEA. The reviews found that the CRU researchers’ scientific rigour and honesty was not in doubt, but the House of Commons Science and Technology Select Committee said that climate scientists should take even more steps to make available all their supporting data—right down to the computer codes they use—in order that research findings should be properly verifiable.

The Climatic Research Unit at UEA, in partnership with the Science and Technology Facilities Council (STFC) e-Science Centre, is now embarking on a JISC-funded project that will address this recommendation. The centre provides computing, data storage and networking infrastructure for today’s advanced science facilities. Building on previous work between the two organisations, the project will examine how best to expose climate data for re-use, make it easier for researchers to cite the data and also to understand its validity. The results will be used by the British Atmospheric Data Centre, who already provide access to a significant proportion of the climate data output of the UK research community.

Professor Trevor Davies, Pro Vice-Chancellor, Research Enterprise and Engagement at UEA, commented: “Climate research data now plays a pivotal role in understanding our planet and shaping the political response to change. We are already one of the major providers of climate data in the UK, but want to go further. The results of this project will provide an exemplar to climate researchers across the academic and government sectors as they seek to respond to demands for even more open access to data. We are very pleased that JISC has recognised this need, and we look forward to our collaboration with the STFC e-Science Centre.”

STFC’s Dr Andrew Woolf remarked: “This JISC programme comes at an exciting time as technical innovations in web science converge with an expectation of greater access to publicly-funded data. We look forward to working with UEA to apply these emerging developments to the challenges of climate research, providing standardised access to processed data, linked both to raw observations and meaningful descriptions of intermediate processing.”

The UEA team, led by Dr Tim Osborn, is one of eight departments around the country who will be working towards models of better data management practice and making data more openly available for reuse by universities and other interested parties.

Other universities involved in this innovative research are the Universities of Bath, Cambridge, Manchester, Newcastle, Oxford, Southampton and King’s College London; the subject areas covered include materials science, freshwater biology, epidemiology and data intensive modelling to predict disease. All the projects are exploring ways of making data and the code used for computer assisted analysis more openly available, in some cases by linking them to publications.

Dr Hodson concluded: “Climate science is by no means unique in the need for researchers to analyse complex data from a number of different sources. The aim of this investment is to improve the way research data is managed in UK universities. By showing how research data can be made more open, this JISC-funded programme will help achieve proper recognition for the essential place of data creation and management in the research process.”

APPENDIX H MERCHANTS OF DOUBT

From Wikipedia, the free encyclopedia

Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming

Author	Naomi Oreskes, Erik M Conway
Subject(s)	Scientists—Professional Ethics Science news—Moral and ethical aspects
Publisher	Bloomsbury Press
Publication date	2010
Pages	355 pp
ISBN	978-1-59691-610-4
OCLC Number	461631066
Dewey Decimal	174.95

Merchants of Doubt is a 2010 book by Naomi Oreskes and Erik M Conway. Oreskes (University of California, San Diego) and Conway (NASA’s Jet Propulsion Laboratory) trace the ways in which a handful of politically conservative scientists, with strong ties to particular industries, have “played a disproportionate role in debates about controversial questions”.^[1] These scientists have challenged the

scientific consensus about the dangers of cigarette smoking, the effects of acid rain, the existence of the ozone hole, and the existence of anthropogenic climate change.^[1] This has resulted in “deliberate obfuscation” of the issues which has had an influence on public opinion and policy-making.^[1] Oreskes and Conway reach the conclusion that:

There are many reasons why the United States has failed to act on global warming, but at least one is the confusion raised by Bill Nierenberg, Fred Seitz, and Fred Singer.^[1]

All physicists, Nierenberg and Seitz worked on the atomic bomb, while Singer was a rocket scientist.^[2] One reviewer of the book states that some “climate sceptics are recycled critics of controls on tobacco and acid rain”.^[3] As Oreskes and Conway state: “small numbers of people can have large, negative impacts, especially if they are organised, determined and have access to power”.^[4]

Seitz and Singer helped set up institutions such as the Heritage Foundation, Competitive Enterprise Institute and Marshall Institute in the United States. Funded by corporations and conservative foundations, these organizations have opposed many forms of state intervention or regulation of U.S. citizens. In each case the tactics are similar: “discredit the science, disseminate false information, spread confusion, and promote doubt”.^[4] UK’s *The Guardian* writes:

Oreskes and Conway in this painstakingly assembled but nevertheless riveting piece of investigative reporting [conclude that the] far right in America, in its quest to ensure the perpetuation of the free market, is now hell-bent on destroying the cause of environmentalism. . . . Hence . . . deliberate misinformation . . . has become the hallmark of a group of far-right institutions that are funded by businesses and conservative foundations and supported by a coterie of rightwing scientists who believe ecological threats are made up by lefty researchers as part of a grand plan to expand government control over our lives. . . . When not funded by the tobacco industry, many of these outfits often receive backing from fossil-fuel companies such as Exxon. . . . In each case, experts offered briefings to journalists and politicians and their claims were accepted, with little qualification, by an acquiescent media happy to establish the idea that there were real divisions among mainstream scientists where none actually existed. . . . Oreskes and Conway deserve considerable praise for this outstanding book and for exposing the influence of these dark ideologues.^[5]

REFERENCES

^[1] http://en.wikipedia.org/wiki/Merchants_of_Doubt#cite-note-pk-0

^[2] http://en.wikipedia.org/wiki/Merchants_of_Doubt#cite-note-sb-1

^[3] http://en.wikipedia.org/wiki/Merchants_of_Doubt#cite-note-2

^[4] http://en.wikipedia.org/wiki/Merchants_of_Doubt#cite-note-rm-3

^[5] http://en.wikipedia.org/wiki/Merchants_of_Doubt#cite-note-Mckie8-4

ADDENDUM

7 September 2010

Further to the UEA submission dated 2 September 2010, where it is indicated that UEA is awaiting a response from the BBC regarding incorrect claims about UEA asking Lord Oxburgh to narrow his brief, a response has been received from the BBC. Discussions with the BBC in this regard are continuing.

Professor Edward Acton

Vice-Chancellor, University of East Anglia

7 September 2010

Supplementary written evidence submitted by the University of East Anglia (UEA Reviews 00a)

ACCOMPANY DOCUMENT—ORAL EVIDENCE SESSION ON 27 OCTOBER 2010

Q66 Graham Stringer

With reference to the statement made by Mr Stringer “. . . particularly as Oxburgh himself said that Briffa couldn’t even reproduce his own work”:

This is not what Lord Oxburgh actually said.

The relevant extract from the September 8 oral evidence session:

Q34 **Graham Stringer:** I have just two final questions. When the panel was carrying out its appraisal were the scientists at CRU able to make accurate reconstructions from the publication back to the raw data that they themselves had used?

Lord Oxburgh: Not in every case. Not with the old material.

By repeating his assertion, which was also made in an earlier interview with The Register, Mr Stringer is promulgating an incorrect interpretation of Lord Oxburgh's statement on the replication of CRU's research results.

Q123 Stephen Mosley

With reference to the query as to whether UEA had any involvement in the InterAcademy Council's review of IPCC processes, as Prof Davies indicated in his reply, the University was not consulted as a University.

The following members of UEA staff were consulted by IAC, in some cases via the Royal Society, on IPCC in their capacities as individual researchers:

Prof Bob Watson
Prof Phil Jones
Prof Mike Hulme

University of East Anglia

11 November 2010

Written evidence submitted by Lord Oxburgh (UEA Reviews 04)

Letter from the Clerk of the Committee to Lord Oxburgh, 21 September 2010

The Committee has asked me to thank you for giving oral evidence on 8 September, which it found very useful.

Members have two follow-up questions and I should be grateful if you could let me have written replies. Your responses may be published by the Committee. The questions follow from the questions and answers at Qq 32 and 33 in the transcript and are as follows.

- Can you explain where the list of eleven papers came from?
- Did the list arrive with the panel before the Royal Society had been consulted?

Thank you for your assistance.

Email from Lord Oxburgh to the Clerk of the Committee, 30 September 2010

Thank you for your message. The two questions:

1. The list of papers came to us from the University as a representative sample of the work of CRU that would offer us a way into the subject. We had no direct or detailed knowledge of the origin of the list but understood that the RS was involved in its production. We made no special inquiries on this matter and attached no particular significance to the origin of the list at the time, nor did we later. It in no way restricted our examination of other publications or material.
2. I think that this is very unlikely but we have no way of telling.

September 2010

Written evidence submitted by the Independent Climate Change E-Mails Review (UEA Reviews 07)

REPORT FROM THE HOUSE OF COMMONS SCIENCE AND TECHNOLOGY COMMITTEE,
PUBLISHED 31 MARCH 2010

RESPONSE FROM THE INDEPENDENT CLIMATE CHANGE E-MAILS REVIEW (CCER)

1. The CCER welcomes the Committee's recognition that the Review is independent and that none of its members have links to the CRU or the IPCC.

2. The CCER has seen no need to amend its terms of reference. It notes in particular the Committee's wish to see the Review recommend future best practice. The Review has always understood its remit to include such recommendations, and therefore sees no need for any change in this respect.

3. The CCER agrees with the Committee on the importance of access to expertise concerning peer review. It has addressed this by commissioning work from the editor of a leading peer review journal and from the Chair of the Committee on Publication Ethics to ensure that Review members have a clear understanding of the relevant issues as they consider the evidence presented to them. It should also be remembered that the scientific members of the Review are fully aware of the importance and practice of peer review through their own extensive work.

4. The CCER shares the Committee's wish for openness and transparency. It has published all submissions unless there are legal constraints such as defamation or copyright, or the submission is abusive. In these cases, the Review has sought the agreement of the author(s) on the means of enabling the submissions to be obtained directly by those wishing to see them. The great bulk of the Review's process has been to deal with or canvass written evidence. Where interviews have taken place, the salient points have been noted and all the notes will be published.

5. In accordance with its remit, the CCER will address the particular issues of data availability and peer review to which the Committee made reference.

6. The CCER noted the Committee's concern that there should be no unmanaged gaps or overlaps between its work and that of the Scientific Appraisal Panel. While respecting the fact that the two reviews were completely independent, CCER contacted Lord Oxburgh, Chair of the Scientific Appraisal Panel, to ensure that he was aware of the approach being taken by CCER to issues that might bear on his work.

7. CCER notes the Committee's proposal that the conclusions of the review should not be conveyed to the University of East Anglia in advance of publication. The reason for this proposal appears to be that to do otherwise might put at risk the review's impartiality. There is no question of any contact with the University prior to publication that would influence the review's conclusions, as distinct from any necessary checking of factual matters. The Review was commissioned by the University to report on policies and practices within the University, and should the Review find matters of concern, then it clearly has a duty to inform the University. The Committee will also be aware that natural justice demands that both the University and members of CRU should be informed directly of any critical findings. Finally, it is also common practice in public and Parliamentary life for the subjects of reports to be given embargoed copies of the documents shortly before publication. The CCER is mindful of the Committee's recommendation, but it sees no reason to depart from normal practice.

Sir Muir Russell

Chairman, Independent Climate Change E-Mails Review

18 May 2010

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